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SOUTHERN AFRICA

ANNUAL REPORT

Resilience in the Limpopo Basin (RESILIM) Program

Year Three: October 2014 – September 2015



October 2015

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EXECUTIVE SUMMARY

Year Three of the Resilience in the Limpopo River Basin (RESILIM) Program has been greatly successful in profiling USAID Southern Africa and the RESILIM program and building and strengthening relationships and networks with stakeholders in the Limpopo River Basin.

RESILIM has managed to start building a network of partner organizations working on building climate resilience – from international structures such as the United Nations Environmental Program (UNEP) and the Global Biodiversity Information Facility (GBIF) in hosting the Africa Rising Conference together with local partners; to transboundary structures such as SADC with the co-hosting of the 6th SADC River Basin Organizations Workshop and the 7th Water Multi-stakeholder Dialogue, and the Great Limpopo Transfrontier Conservation Area (GLTFCA) with the development of a livelihood diversification strategy; to various national and local partners. Strong relationships and networked organization are a key requirement to achieving improved climate resilience in the basin.

Climate vulnerability reduced:

This year RESILIM participated in and implemented various outreach and awareness campaigns. With global reports on climate change becoming increasingly disheartening, RESILIM has focused its messaging on the opportunities that exist to build climate-resilience, as per the recommendations from the RESILIM Risk and Vulnerability Assessment, to not only absorb the impacts of climate change, but to respond to these challenges through the diversification of livelihoods that derive socio-economic benefits from sustainable natural resources management and conservation.

RESILIM celebrated Water Week 2015 with its partners, the South African Department of Water and Sanitation (DWS) and the Botswana Department of Water Affairs (DWA) in the respective countries by hosting water dialogues, school outreaches and field visits. RESILIM and its partner in improved catchment management, the Marico River Conservation Association (MRCA), reach over 600 community members with a door-to-door campaign, sharing information on the impacts of climate change and best practices on water conservation such as grey water systems and rainwater harvesting.

More than 1700 youth learned more about the wonder of science in nature, the functionality of ecosystems, climate change, and the importance of water conservation at the Science for Resilience Expo. A replica of the Limpopo River Basin was built and stands as a permanent structure at the venue of the Expo. During the expo it was used to visually explain to pupils the different elements that make up the Limpopo River Basin system, and how decisions made upstream can impact negatively or positively downstream, all the way to Mozambique. This structure is continue to being visited every day by students attending youth conservation camps.

Conservation and management of priority ecosystems improved:

In Year Three RESILIM participated in two major global biodiversity-related events: the World Parks Congress and the World Forestry Congress where RESILIM shared and learned key messages on resilience building.

RESILIM supported the participation of a park manager from the Makuleke Contractual Park in the Great Limpopo Transfrontier Conservation Area and other, in partnership with the USAID's Southern Africa Regional Program (SAREP), delivered five technical presentations to delegates at the conference, held in Sydney, Australia. RESILIM, SAREP and IUCN committed to bring the messages from the

conference to Southern Africa and hosted the first post-World Parks Congress workshop in South Africa together with the country's Department of Environmental Affairs. RESILIM focusses on the interface between biodiversity, livelihoods and climate change, and is now incorporating the World Parks Congress lessons into the Great Limpopo TFCA alternative livelihoods strategy.

RESILIM took eight community delegates from significant water producing and conservation areas identified in the RESILIM Risk and Vulnerability Assessment as important for the long term resilience of the basin, to the World Forestry Congress that was held in Durban, South Africa. At the Congress the delegates learned about the role forestry can play in climate change adaptation and biodiversity conservation.

RESILIM further participated in the revision of South Africa's National Biodiversity Strategic Action Plan and is recognized in the plan as one of the essential investors of technical expertise in the plan. The intervention recommendations in this plan, which includes recommendation from the RESILIM Risk and Vulnerability Assessment, will guide government and non-government investment in building resilience of ecosystems in South Africa for the next ten years.

Furthermore, RESILIM supported the Marico Conservation River Association with their application of 19 674 hectares of protected area that will serve as the core area for a proposed Marico Biosphere Reserve.

Another great success for biodiversity conservation in the Limpopo River Basin is that RESILIM and the Centre for the Sustainable Development of Coastal Zones (CDS-ZC), through its partnership in the rehabilitation and conservation of the mangrove ecosystem in the Limpopo River estuary, planted 100 000 mangrove seedlings in a 10 hectare area.

Funds leveraged for climate change adaptation and biodiversity conservation:

In Year Three, RESILIM managed to leverage more than USD 260 000 towards various climate change adaptation and biodiversity conservation interventions from newly formed partnerships. Peace Parks is matching RESILIM dollar-for-dollar, to about USD 148 000, in its partnership to develop a livelihood diversification strategy for the Great Limpopo Transfrontier Conservation Area. The International Water Management Institute is contributing USD 78 000 to the partnership with RESILIM in the research on the potential of the transboundary Ramotswa aquifer. The Kwalata Community Development Initiative and other partners contributed and invested about USD 34 000 in the Science for Resilience Expo to inspire and capacitate over 1700 youth for a more resilient future.

Increased resilience for people through increased adaptive capacity:

In Year Three, 2 604 people, of which 1 418 are women, have increased their adaptive capacity to cope with impacts of climate variability as a result of RESILIM support through various projects. These projects include various trainings with stakeholders to better understand climate-resilience through ecosystem and water conservation that can diversify livelihoods. Trainings, such as a training in the economic valuation of mangroves provide stakeholders with science-based tools to make the case for ecosystem conservation and payment for ecosystem services. The upgrade for the mangrove community nursery in Xai-Xai, Mozambique and the replantation project as part of RESILIM's support to CDS-ZC to rehabilitate and conserve mangroves in the Limpopo River Estuary saw more

community members, mostly women, employed or involved in the mangrove seedling collection, replantation and other conservation efforts.

See Annex One for more details on RESILIM's results against program indicators.

Challenges and remedial actions

RESILIM's LIMCOM-related challenges continue, but the program is continuing efforts to better understand where the capacity needs and bottle necks for progress lies. Thus, in Year Three RESILIM conducted an Institutional Capacity Needs Assessment to identify opportunities within institutions for designing interventions that build and strengthen resilience to climate impacts, identify common challenges and opportunities for transboundary projects that enhance resilience capacities, and to develop a capacity strengthening plan for transboundary institutional resilience building. The primary beneficiary is LIMCOM, but the governments of the four basin countries are also beneficiaries at national level. The plan is targeted at all basin custodian institutions and possible investors in capacity strengthening initiatives that would result in improved resilience across the system.

As RESILIM is planning the last two years of the program, dubbed the consolidation phase, RESILIM will involve LIMCOM in the planning and share the draft RESILIM work plan to explore further ideas how RESILIM can support LIMCOM. For example, the LIMCOM 2011 – 2015 Integrated Water Resource Management Plan is coming to an end and will need to be revised.

RESILIM has also experienced challenges in soliciting buy-in from stakeholders at the various levels of consultations, which delayed the completion of key products such as the Limpopo Basin Disaster Risk Reduction Strategy, the Water Demand Management Strategy and the Basin Communication Strategy for LIMCOM. Coordination across the four countries have been time consuming and delayed getting these activities off the ground.

Similarly, RESILIM has been presented with challenges attaining buy-in from a complex system of stakeholders in the basin into the RESILIM Risk and Vulnerability Assessment and draft Investment Strategy. Moving forward, RESILIM has developed a strategy to be more sufficient in its engagement with stakeholders by bringing RESILIM products together when presenting to stakeholders instead of presenting products in its various levels of completion at separate events. Once the products are finalized, RESILIM will work at embedding these products in institutions across the basin.

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ACRONYMS

AHEAD	Animal Health for the Environment and Development
AMCOW	African Ministers Council on Water
ARA-SUL	Administração Regional de Águas or Mozambique Department of Water Affairs
AWARD	Association for Water and Rural Development
CC	Climate change
CCASWS	Climate Change Adaptation Strategy for the Water Sector
CDS-ZC	Centro de Desenvolvimento Sustentável das Zonas Costeiras, or Centre for the Sustainable Development of Coastal Zones
CGIAR	Consultative Group for International Agricultural Research
CPA	Communal Property Association
CSIR	Centre for Scientific and Industrial Research
CSO	Civil Society Organization
DEA	Department of Environmental Affairs
D-Lab	Development Lab
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DWA	Department of Water Affairs
DWNP	Department of Wildlife and National Parks
DWS	Department of Water and Sanitation
EFI	Economic Financial Tool
GBIF	Global Biodiversity Information Facility
GGRETA	Groundwater Resources Governance in Transboundary Aquifers
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit, or German Agency for International Cooperation
GLTFCA	Great Limpopo Transfrontier Conservation Area
GLTFP	Great Limpopo Transfrontier Park
GWP-SA	Global Water Partnership Southern Africa
ICCA	Indigenous Community and Conserved Areas
ICP	International Cooperating Partner
INGC	Instituto Nacional de Gestão de Calamidades, or National Institute of Disaster Management
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management
JPTC	Joint Permanent Technical Committee
KCS	Kalahari Conservation Association
KNP	Kruger National Park
KYT	Kgetsi ya Tsie Women's Group

Lab	Global Development Lab
LIMCOM	Limpopo Watercourse Commission
LRB	Limpopo River Basin
MAR	Managed aquifer recharge
MEWT	Ministry of Environment, Wildlife and Tourism
MIT	Massachusetts Institute of Technology
MOU	Memorandum of Understanding
MRCA	Marico River Conservation Association
NAM	Instituto Nacional de Meteorologia de Moçambique, or National Institute of Meteorological Services
NBSAP	National Biodiversity Strategic Action Plan
NGO	Non-government Organization
OSC	Overseas Strategic Committee
PA	Protected Areas
PPF	Peace Parks Foundation
R&V	Risk and Vulnerability
RBO	River Basin Organizations
RESILIM	Resilience in the Limpopo River Basin
RSAP	Regional Strategic Action Plan
RVAA	Regional Vulnerability Assessment and Analysis
SADC	Southern Africa Development Community
SANBI	South African National Biodiversity Institute
SAQA	Southern Africa Qualification Authority
SARDC	Southern African Research and Documentation Centre
SAREP	Southern Africa Regional Environmental Program
SASSCAL	Southern African Science Service Centre for Climate Change and Adaptive Land Management
SAWC	Southern Africa Wildlife College
SAWS	South Africa Weather Service
SIWI	Stockholm International Water Institute
SPEDU	Selebi-Phikwe Economic Diversification Unit
TFCA	Transfrontier Conservation Area
TRMC	Tati River Management Committee
UNCCD	United Nation Convention to Combat Diversification
UNEP	United Nations Environmental Program
UNESCO-IHP	United Nations Educational, Scientific and Cultural Organization International Hydrological Program
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
VAC	Vulnerability Assessment Committees

WACDEP	Water, Climate and Development Program
WCMC	World Conservation Monitoring Centre
WDM	Water Demand Management
WHS	World Heritage Site
WLE	Wetlands, Land and Ecosystems Program
WRCS	Water Resource Classification System
WTP	Willingness to Pay
WUC	Water Utilities Cooperation
WWF	World Wildlife Fund
ZINWA	Zimbabwe National Water Authority

YEAR THREE PROGRESS RELATIVE TO RESULTS

Component I: Vulnerability of the Limpopo River Basin reduced

I.1 Development of Limpopo River Basin Disaster Risk Reduction Action plan

In 2013 RESILIM and the Global Water Partnership Southern Africa (GWP-SA) commenced with the process of developing a Disaster Risk Reduction (DRR) strategy and action plan for the basin in support of the Limpopo Watercourse Commission (LIMCOM) with the implementation of its 2011 - 2015 Limpopo Basin Integrated Water Resources Management (IWRM) Plan. The IWRM Plan acknowledges the UN-HABITAT work on the Limpopo Basin Strategic Plan for Reducing Vulnerability to Floods and Droughts, and recommends for its review and update.



207 stakeholders

implementing risk reducing practices/actions to improve water conservation and water demand management, such as early-warning systems, the inclusion of ecosystem impacts, and transboundary DRR cooperation.

LIMCOM
LIMPOPO WATERCOURSE COMMISSION



LIMCOM was formed to improve the transboundary management of water resources. LIMCOM has put in place a strategic Plan, the 2011 – 2015 Limpopo Basin IWRM Plan with the goal of *developing capacities (individual, organizational and institutional) in the riparian states for sustainable management and development of the Limpopo River Basin.*

RESILIM is supporting the implementation of this plan to reach its objective of improved disaster management, in particular the operation objective on disaster preparedness where LIMCOM tends to *strengthen the coordination among the member states to reduce the adverse effects of droughts and floods, with the development of a Disaster Risk Reduction Strategy and Action Plan.*

A diagnostic assessment was carried out with a view to identify strategic problems associated with disaster risk management and how DRR could be used as a tool to enhance resilience of ecosystems and livelihoods in the Basin. The process involved an analysis of socio-economic and bio-physical factors of DRR and their interaction with resilience building.

As part of the foregoing, RESILIM and GWP-SA also conducted in-country consultations in Year Three with key stakeholders dealing with the climate-related disasters. The consultation workshops identified the strategic problems associated with disaster risk management, and made recommendations for a DRR action plan that is also addressing climate change-related disasters.

1.1.1 Findings of in-country consultations: The status of factors that influence resilience in the Limpopo River Basin

The following is adapted from Turnbull et.al¹, and guide include the analysis of key factors behind DRR and how such can be applied to enhance the resilience of the basin to climate change:

Factors influencing resilience	<ul style="list-style-type: none"> • Assessing how the factor is contributing to enhancing resilience in Disaster Risk Management (DRM)
Institutional and policy landscape	<ul style="list-style-type: none"> • SWOT analysis on the institutional, political and policy environment with regards to DRM towards resilience building
Cultural	<ul style="list-style-type: none"> • Assessment on how indigenous knowledge, practices and system are taken into consideration in DRM
Socio-economic	<ul style="list-style-type: none"> • Analysis of the social and economic situation in the basin and how this is impacted by water related hazards in the basin (strengths and weaknesses)
Human development	<ul style="list-style-type: none"> • Analysis of poverty issues and how these influence recovery and vulnerabilities
Environment	<ul style="list-style-type: none"> • Analysis of the impact floods and droughts on the environment/biodiversity and land use
Physical	<ul style="list-style-type: none"> • Analysis of infrastructure with regards to loss and damages and operation in DRM



Institutional and policy landscape

All four countries have been successful in the establishment of institutions that manage disasters at various levels – the effectiveness of the institutions, however, varies and needs to be strengthened. The countries have also developed legislation and are at various stages of ensuring that legislation is implemented.

However, capacitated institutions are needed to implement climate-resilient DRR that can influence land-use, development decisions and development planning up-stream.

The DRR Action plan will consider the strengthening of institutional capacity that will improve climate resilience in the basin. Such interventions include:

- a) **Improve data generation, interpretation into information and communication** between and within countries, especially regarding disaster preparedness. There are currently no clear guidelines on dealing with cross-border information sharing and cooperation for disaster management.

¹ M. Turnbull et.al. 2013. Toward Resilience – A guide to Disaster Risk Reduction and Climate Change Adaptation. Practical Action Publishing Ltd. Warwickshire.

- b) **Harmonization of policies, clarification of mandates and cooperation between DRR and DRM state and non-state actors.** LIMCOM could play this coordination role.
- c) **Leverage funds for institutions and the implementation of plans and policies.** Often DRM budgets allocate funds for responding to emergencies and very little is allocated towards preparedness and being anticipative, a key element of resilience building.



Cultural issues and disaster management

Cultural values and traditional institutions can play a critical role in mobilizing and communicating with local people in disaster management. A DRR Action Plan that will improve climate-resilience in the basin needs to **include documentation and incorporation of indigenous knowledge practices and systems in planning** and implementation of strategies and actions.

Socio-economic issues, human development and disaster management

The Limpopo River Basin supports various forms of livelihoods in the basin, ranging from subsistence agriculture, to eco-tourism to mining. Climate disasters have a negative impact on economic growth and livelihoods of especially the people who rely on natural resources.



On average, subsistence farmers in the basin only produce enough food to feed their families adequately for **less than eight months of the year**



live on <\$1 per day

It is thus essential for the DRR Action Plan to include interventions that:

- a) **Integrate disaster risk management into development planning at all levels;**
- b) **Carry out vulnerability and risk for disasters assessments in the basin** to gain a better understanding of the impact of floods and droughts to social and economic activities in the basin, identify the highly vulnerable areas and plan disaster mitigation strategies;
- c) **Promotes gender and equity.**



Environmental issues and disaster risk management

Well-managed ecosystems can mitigate the impact of most natural hazards, such as landslides, hurricanes and cyclones. In addition, productive ecosystems can support

sustainable income-generating activities and are important assets for people and communities in the aftermath of a disaster².

Therefore, proper land-use planning and management are critical in disaster management as poor land planning and use weakens the resilience of communities and ecosystems to respond to disasters.

A DRR Action plan that will build climate resilience when implemented should consider the following environmental issues:

- a) **Improve land management practices** for mitigation of disasters or the minimization of the impact of disasters
- b) Increase the understanding of the potential **impacts of climate-related disasters on biodiversity and ecosystems in the basin to inform DRR planning**. Climate-related disasters can affect biodiversity through the spread of invasive species, mass species mortality and the loss of habitat³. Poorly planned post-disaster response and reconstruction work often do more damage to biodiversity than the disaster itself. This in turn threatens the ecosystem services — including food and medicinal plants and animals, clean water and air and buffers from extreme natural events — that are critical to people's livelihoods.

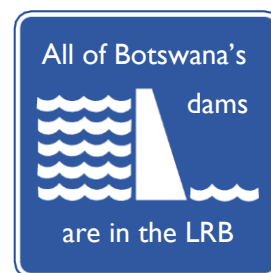


Physical infrastructure and disaster management

Water infrastructure can play a critical role in storing water for drought management and also act as a retention structure in flooding situations. However, if not properly managed physical infrastructure can also worsen disasters and cause destruction.

Interventions in the DRR Action Plan should include:

- a) **Investment in climate proof physical infrastructure** for mitigating flood and droughts
- b) **Promotion of joint operation of infrastructure, such as joint dam operations**. LIMCOM can play a key role in facilitating such linkages amongst state parties.



1.1.3 Climate change uncertainty:

The RESILIM Risk and Vulnerability Assessment⁴ generally concludes that rainfall events are expected to become heavier, with increased risks of local and regional flooding. Dry spells and droughts are expected to increase in frequency and severity, and changes in tropical cyclones along the Mozambique coast remain uncertain, but could become more intense.

The uncertainty of climate change projections means that a DRR Action Plan needs to strategize for both extremes, flooding and droughts. The information gathered through the diagnostic analysis, including in-country consultations, is being used to put in place a DRR action plan that also promotes

² Seier-Rieux, K. et al. (2006). Ecosystems, Livelihoods and Disasters: An integrated approach to disaster risk management. IUCN, Gland, Switzerland and Cambridge, UK,

³ Seier-Rieux, K. et al. (2006). Ecosystems, Livelihoods and Disasters: An integrated approach to disaster risk management. IUCN, Gland, Switzerland and Cambridge, UK

⁴ Petrie, B., Chapman, A., Midgley, A. and Parker, R. (2014) Risk, Vulnerability and Resilience in the Limpopo River Basin System: Climate change, water and biodiversity – a synthesis. For the USAID Southern Africa "Resilience in the Limpopo River Basin" (RESILIM) Program by OneWorld Sustainable Investments, Cape Town, South Africa.

resilience to climate change, taking into account the current variability and also the projected extreme events for both floods and drought situations.

Increasingly, development and disaster management practitioners are discovering the need for using approaches that integrate concepts from both DRR and climate change adaptation. Both concepts look at issues of exposure and vulnerability - the greater the vulnerability and exposure and magnitude or likelihood of the hazard/climate change impact the greater the hazard. Meaning exposures and vulnerabilities need to be reduced and capacities for resilience built to address both disasters and climate change risks simultaneously.

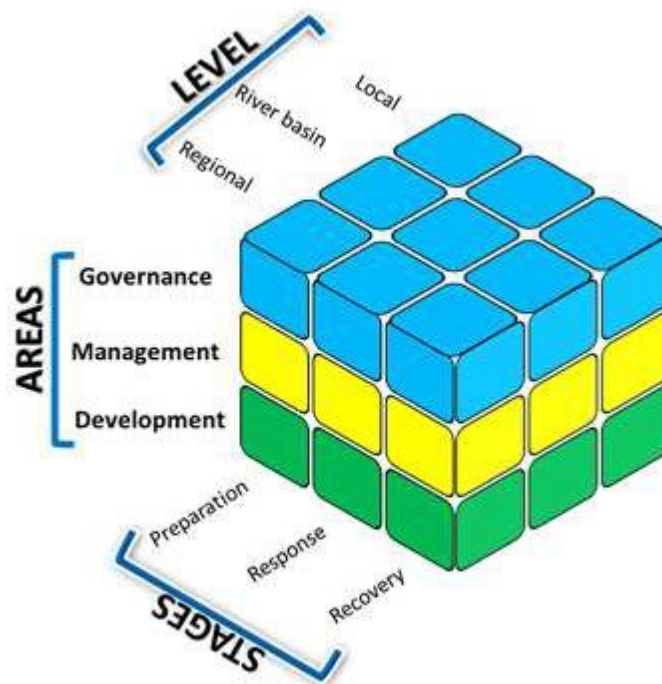
1.1.4 Presentation of in-country consultation findings at regional workshop

Following the in-country consultations, RESILIM and GWP-SA hosted a two-day regional workshop in March in Maputo, Mozambique with 25 disaster management stakeholders from across the basin who all have interest and influence in the practices and actions that contribute to water conservation and water demand management. Through the facilitation of workshop on the development of national and regional coordination mechanisms that link disaster risk reduction and adaptation plans, RESILIM and GWP-SA was able to promote climate-related disaster risk reducing practices and actions that will improve water conservation and water demand management. Stakeholders discussed and proposed actions that needs to be taken at different levels to ensure the improved disaster preparedness of the basin to mitigate, respond and recover to the climate and water-related disaster issues and challenges. The input from expert stakeholders provided guidance on the development of a draft DRR Strategy and Action plan for the basin.

Stakeholders at the meeting also learned more about what neighboring countries are doing with regarding disaster risk reduction, how to align ecosystem management and expected climate change with national development plans, and make use of this platform to move from national DRR management to basin level DRR.

1.1.5 Moving forward

The analysis of the information collected from literature review, the in-country consultations and the regional workshop, will be used to develop the Limpopo River Basin DRR Action Plan using the following framework, adapted from the SADC Climate Change Adaptation Strategy for the Water Sector (CCASWS):



Once the draft action plan has been developed will be presented to stakeholders in the four riparian countries for further input, following a request from LIMCOM to host a second round of in-country consultation. The final draft DRR Action Plan will be presented at a regional workshop, which will include members of LIMCOM, for approval and finalization.

Other support to LIMCOM – Water Demand Management

The IWRM Plan calls LIMCOM to promote methods of increasing water availability and the efficient use of water. Supporting LIMCOM, RESILIM partnered with GWP-SA to conduct a cost-benefit analysis on different water demand strategies applied against a business as usual approach. This analysis will assist water resources managers to present economic arguments on why it is important to invest in specific WDM strategies as key water resources management interventions for enhancing resilience of people and ecosystems in the basin and allow decision-makers to make informed decisions on suitable investments related to various WDM strategies.

An inception report and methodology has been developed and moving forward in Year Four, RESILIM, through its partnership with GWP-SA will conduct in-country consultations in the four riparian countries of the basin, and the information gathered will be converted into a draft action plan that will be presented at a regional workshop to be endorsed and finalized.

1.2 Building resilience through the diversification of livelihoods: Marula oil production

In Year Two RESILIM, in partnership with the Kalahari Conservation Society (KCS), built the capacity of the Kgesti ya Tsie a women's rural development group based in Lerala, Botswana to improve the quality and quantity of their marula oil production over a period of seven months. October 2015 marked the close-out of the RESILIM-KCS partnership.



Knowledge management product

Developed that promotes the integration of climate change adaption in livelihood diversification plans

RESILIM produced a knowledge management product that promoted the integration of climate change adaption in livelihood diversification plans. This first product in the series, titled *Resilience Series #1: Marula oil production as a climate change adaptation strategy*, looks at how the women of KYT have been able to, with RESILIM support, produce high quality marula oil, ready for export to the Western cosmetic market. This step-by-step video takes the viewer through not only the process of marula oil production that will enable the viewer to replicate the process elsewhere in the basin and beyond, but also look at the reality of living in a basin where water is scarce and climate change is expected to make life more difficult.



Above: The packaged marula oil, produced by the Kgesti ya Tsie women's group.



Marula oil is a highly sought after commodity used in cosmetic products because of its high nourishing properties as well as being a good carrier of other medicinal or fragrant oils. Phytotrade estimated that in 2014 there was a global deficit of 500 tons of marula oil.

Opportunities for further investment for improved capacity, identified by KCS:

- Increase capacity of the women's group in business enterprise and management through training on the marula oil value chain
- Research into new technologies in cracking and pressing
- Investment in the integration of youth into the process in order to improve the sustainability of the KYT oil production
- Upgrade of the existing facilities' infrastructure

RESILIM, in response to a request from KCS and KYT, facilitated discussions between KCS and KYT and Debswana (DeBeers and Botswana Diamond Mining Company), Classic Woods, and Selebi-Phikwe Economic Diversification Unit (SPEDU) from the private sector, as well as the University of Botswana and Project Concern International⁵. The meeting discussed possible partnership arrangements that could address capacity-related challenges that continue to stop KYT becoming a sustainable business. Partners at the meeting recognized that a collective effort is needed to strengthen KYT's capacity to institutionalize and commit to the terms and conditions of its various partnerships.

1.3 Building resilient ecosystems: Mangrove ecosystem restoration and conservation

1.3.1 The global threat to mangroves

Globally, mangrove areas are declining rapidly as they are cleared for coastal development and aquaculture and logged for timber and fuel production. Climate change is also considered a threat to all mangrove species. In the future, sea-level rise and flooding will be the biggest threat to mangrove ecosystems⁶.

Given their accelerating rate of loss, mangrove forests may at least functionally disappear in as little as 100 years⁷. Current exploitation rates are expected to continue unless mangrove forests are protected as a valuable resource.



100 000 mangrove seedlings planted



Upgraded mangrove nursery

for improved capacity to address climate change and conserve biodiversity



Economic valuation

assessment of the mangrove ecosystem for improved management of ecosystems



Tool/guideline developed for the economic valuation of mangroves



33 stakeholders trained in the economic evaluation of mangroves guidelines

⁵ Project Concern International is an organization that looks at the prevention of disease, improved community health and the promotion of sustainable development worldwide (<http://www.pciglobal.org>).

⁶ C. Giri, et. Al. 2011. Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology and Biogeography*. Vol. 20, 154–159.

⁷ Polidoro BA, Carpenter KE, Collins L, Duke NC, Ellison AM, Ellison JC, et al. (2010) The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern. *PLoS ONE* 5(4): e10095. doi:10.1371/journal.pone.0010095. Available at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0010095#references> [Accessed: 28 September 2015].

26% of the world's mangrove forests degraded due to over-exploitation for fuelwood and timber production

40% of animal species that are restricted to mangrove habitat and have been assessed under IUCN Categories and Criteria are at elevated risk of extinction due to extensive habitat loss

Between 20% and 35% of mangrove area lost since 1980,

with an **global annual disappearing rate of approx. 1%**

1.3.2 Mangrove forests in the Limpopo River Basin

The mouth of the Limpopo River is the only place in the Limpopo river Basin where mangroves can be found. Mangrove forests in the river estuary at Xai-Xai, Mozambique, have experienced accelerated deforestation, mainly due to anthropogenic factors such as over-harvesting, land clearing for agricultural purposes and the damage caused by the floods in 2000 which deposited too much silt on the mangroves breathing roots.

Given the Xai-Xai communities reliance on the marine ecosystem for food and income, a rehabilitated and healthy mangrove ecosystem will significantly reduce community vulnerability and improve their resilience to climate variability.

Thus, in January 2014 RESILIM partnered with CDS-ZC to rehabilitate mangrove ecosystems in the river estuary and support the implementation of best practices in mangrove rehabilitation and conservation.

First the partnership mapped twelve kilometers of the Limpopo River Estuary and, with a baseline established through aerial photographs in 2005, found that the mangrove vegetation in the estuary degraded from about 900 hectares to just more than 500 hectares of mangrove vegetation⁸. According to CDS-ZC, one of the underlying drivers of mangrove depletion and degradation is the local communities' lack of information and awareness of mangroves' economic value.

What makes mangroves so special?



Grows in terrestrial, estuarine, and near-shore marine ecosystems interface in tropical and subtropical regions.



Protects inland ecosystems and human communities from damage caused by coastal erosion, storms and salt water intrusion.



Provides critical habitat for a variety of terrestrial, estuarine and marine species



Serves as a source of nutrients and sediments for other inshore marine habitats including seagrass beds and coral reefs.



80% of global fish catches are directly or indirectly dependent on mangroves



USD1.6 billion per year provided in ecosystem services

(Polidoro, 2010).

⁸ Da Silva, A. et al. (2014). *Mapping of the Healthy and Degraded Mangrove vegetation in the Limpopo Basin Estuary*. For the USAID Southern Africa Resilience in the Limpopo River Basin (RESILIM) Program.

1.3.3 The economic value of mangrove ecosystem in the Limpopo River estuary

In Year Three, RESILIM and CDS-ZC appointed a regional ecosystem economist to do an economic valuation of mangrove ecosystems in the river estuary, to better understand the value of the livelihood and ecosystem services the Xai-Xai mangroves provide. This information will be used to improve capacity for economic decision-making at the household, district and national level for sustainable mangrove utilization and land-use planning processes.

The study commenced with a stakeholder engagement workshop in October 2014 to solicit buy-in from the key stakeholders prior to the field-work components of the valuation. Stakeholders included government officials, the local chief, community leaders and representatives from non-governmental organizations.

The findings of the economic valuation were shared and validated at a second stakeholder engagement workshop where the participants were trained in the economic valuation guidelines produced by RESILIM and CDS-ZC, and a report on the mapping of the mangrove vegetation in river estuary was also shared with the attendees⁹. See Annex Two for the methodology and the approach used to conduct the economic valuation.



Above: RESILIM and CDS-ZC hosted a stakeholder engagement workshop to solicit buy-in from stakeholders regarding the study to determine the economic valuation of the mangrove ecosystem. Another meeting was hosted to share and validate the findings.

More about CDS-ZC:

CDS-ZC is a Mozambique parastatal organization supporting coastal natural resources planning and use on behalf of the Mozambican Ministry of Land, Environment and Rural Development. Apart from mangrove rehabilitation, CDS-ZC also implements aquaculture projects, study water saline intrusion and soil suitability and other in-land activities that influence coastal zones, assess climate vulnerability in Mozambique, and participate in LIMCOM and other transboundary committee meeting to ensure the consideration of the environmental issues Mozambique faces.



⁹ In Year Two RESILIM mapped the Limpopo River Estuary to determine the status of the mangrove vegetation in the estuary and inform possible conservation and replantation areas, as reported in *RESILIM Annual Progress Report October 2013 – September 2014*.

The findings of the economic valuation of the mangrove ecosystem in the Limpopo River estuary:

The assessment reconfirmed the multi-functionality of mangroves, providing various products, functions and services of high ecological and economical value. Over 120 fish species and diverse shellfish species breed and live in the mangroves. The mangrove flora and fauna have various ecological functions that contribute to its productivity; for instance, the shellfish break down litter and absorb any excessive metals and nutrients which could otherwise upset the ecological balance. In turn some fauna are a source of food for various types of fish. The ecological relationship between mangrove fauna and flora is closely intertwined through an ecosystem food web.

Non-anthropogenic activities, particularly floods, have catastrophic impacts on mangroves and could worsen with climate change. Mangroves can potentially mitigate against climate change impacts, and have protective functions against coastal erosion. These functions include the dissipation of wave energy, control of flooding and storms, and sediment load regulation, which contribute to the protection of sea grass and corals reefs. Protection of these ecosystems significantly contributes to offshore commercial fishing, the control of salt water intrusion into agricultural land, and more.

Direct and indirect economic value:

Shellfish, fish and fuel wood were indicated to be the most important in communities' livelihoods. Market price based approaches were used to determine the value of these products. The tables below indicates the direct and indirect value of the economic value of the ecosystem services mangroves provide.

Table: Economic value of the identified products based on quantity harvested on annual basis

Product	Economic value (Millions USD)¹⁰
Fish	4.321
Crustaceans (shellfish)	3.022
Timber	1.038
Traditional medicine	0.017
Fuel wood	0.008
Apiculture (beekeeping)	0.001
Total direct use value	8.407

Indirect values are the economic values that are associated with the contribution of the mangrove ecosystem to production processes. In this case the mangrove products are not harvested, but its attributes positively influence the production of goods and services. For instance, by controlling floods, mangroves regulate salt water from intruding into agricultural fields and thus positively impacts upon agricultural productivity. Deriving the indirect use value was based on production function techniques

¹⁰ Converted from Mozambican Metical to US Dollars as per 29 September 2015. [Online]. Available at <http://www.oanda.com/currency/converter/>. Accessed 29 September 2015.

and replacement costs methods. However, due to limited data, some of the vital economic values of mangroves were not estimated.

Table: Indirect economic value of mangrove ecosystems

Mangrove function	Economic value (million USD) ¹¹
Carbon sink	0.9
Offshore fishery	0.76
Total indirect use value	1.66

Thus, the total use value of mangroves was estimated at about 10 million USD, annually¹². However, this excludes the contribution to agriculture and sedimentation control which protects coral reefs. As coral reefs and sea grass contribute to the commercial fishery sector, the value of this protective function is partially included in the estimations.

Willingness to pay:

In addition to the direct and indirect use value of the mangroves, the study found that many households were willing to pay (WTP) for the conservation and rehabilitation of the mangrove forest, in either the form of cash or labor.

84% are willing to pay **10 days** of labor valued at **\$15**

16% are willing to pay **\$1.65** cash per month

The big difference between WTP in cash and labor is mainly due to the psychological effect of the value of money, which means that labor is assigned a lesser value, relative to paying in cash.

Sustainability of the project:

The economic valuation also evaluated the sustainability of the mangrove restoration and conservation project based on economic, social and ecological aspects. The project was assessed to be financially unsustainable. Even though it has a healthy mix of financing resources, there are no measures in place to internally generate revenue. The results indicated a need to devise measures for internal revenue generation. CDS-ZC, being highly human resourced, was found to be highly capable to solely implement the project without the support of external expertise. It was found that law enforcement and monitoring, however, is lacking resulting in the high exposure of seedlings and new established mangroves to unsustainable practices such as unregulated harvesting.

¹¹ Converted from Mozambican Metical to US Dollars as per 29 September 2015. [Online]. Available at <http://www.oanda.com/currency/converter/>. Accessed 29 September 2015.

¹² Converted from Mozambican Metical to US Dollars as per 29 September 2015. [Online]. Available at <http://www.oanda.com/currency/converter/>. Accessed 29 September 2015.

Recommendations from the economic valuation:



The economic valuation acknowledges that *communities are the main beneficiaries* of the mangrove restoration and conservation project.



The community should *maximize the benefits from indirect uses of mangroves*, as indirect benefits do not result in the harvesting of mangroves. There is a need to agree and implement additional economic activities, such as aquaculture, bee keeping, agricultural practices, and eco-tourism. There is a need to find ways to relieve pressure created by the harvesting of mangroves for fuel. The potential for eco-tourism and other economic activities should be explored through a feasibility and viability assessment and the development of management plans with an emphasis on cost benefit analysis.



Improve monitoring and law enforcement through co-management by the community, which means the community is included in the decision-making process.



Design and implement *tools for revenue generation* to ensure the financial sustainability of the project. One way to generate revenue for monitoring and law enforcement is through Payment for Ecosystem Services¹³.



Disseminate information on the actual values and economic contribution of mangroves to the communities' household income.

1.3.4 Development of communication materials

The last area of support included the development of communication materials for an awareness campaign in the local schools around Xai-Xai. With support from a communications consultant, RESILIM and CDS-ZC incorporated some of the findings of the economic valuation assessment, and developed 6 teaching lessons for teachers and a posters for the classroom. See Annex Three for the Teaching Notes and the poster. In addition, the communications consultant leading the development of the communication materials and the RESILIM Outreach and Communication Specialist, worked closely with Ms. Laissone to strengthen her technical communication skills.



Above: Ms. Jacinta Laissone, Communication Specialist at CDS-ZC put her improved skills to the test during World Ocean Day on June 8, 2015.

"I learned more about the different approaches and methodologies for developing awareness materials and how to develop and conduct surveys."

*~ Jacinta Laissone, CDS-ZC
Communication Specialist*

¹³ Examples of payment for ecosystem services include charging for using products, the sale of sustainably harvested products and time, REDD++ programs.

1.3.5 Mangrove Community Nursery Upgrade

RESILIM supported CDS-ZC with the upgrading to the community mangrove nursery to increase the number of seedlings the nursery and cultivate at a time and speed up the cultivation period of seedlings.

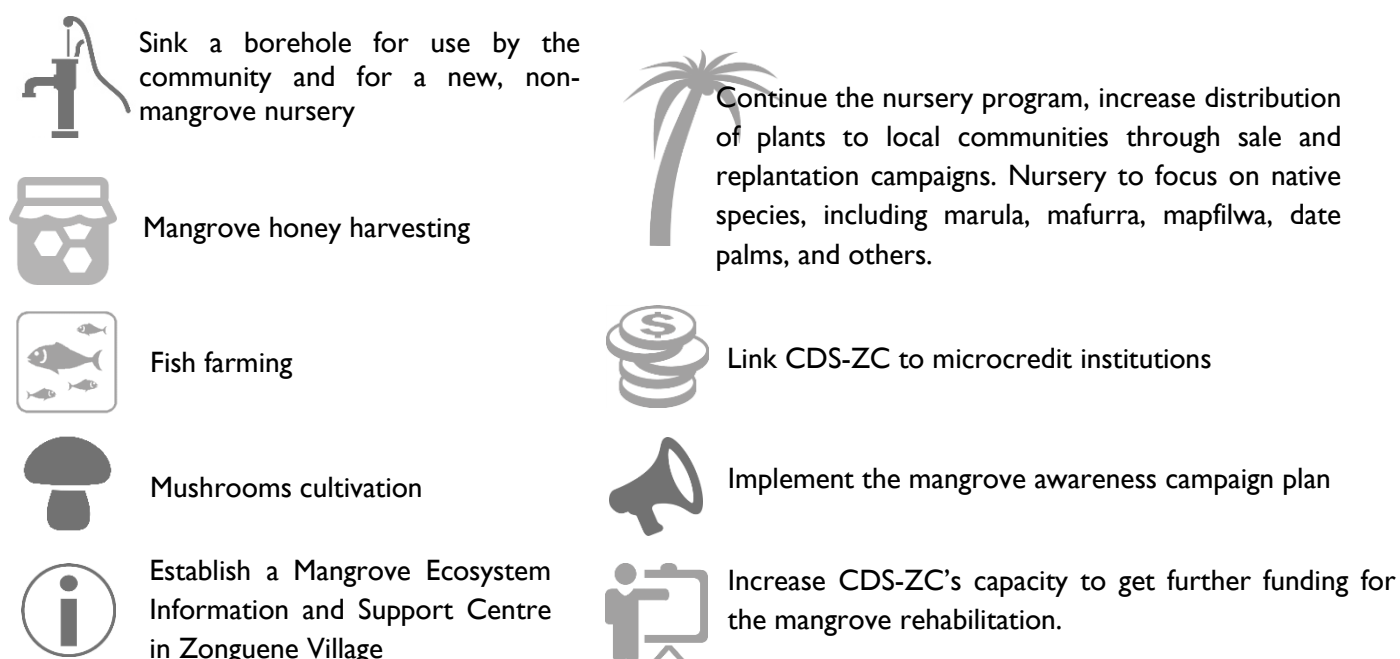


1.3.6 Further opportunities to build resilience

The key challenge facing the local community who are voluntarily replanting the mangroves is the lack of clean fresh water. The water in the estuary is too saline and polluted for the community to drink or use to cultivate crops or fruit trees. Installing a borehole in the village that provides access to clean water for drinking, domestic use and cultivation of crops and fruit trees would immediately strengthen the resilience of livelihoods in the Zonguene community who have become the responsible custodians of the mangroves.

RESILIM, CDS-ZC and [PhytoTrade Africa](#)¹⁴ met to discuss additional areas of support to CDS-ZC to further build resilience of people and ecosystems in the Limpopo River estuary.

The initial concept involves the following areas of support:



1.3.7 Moving forward

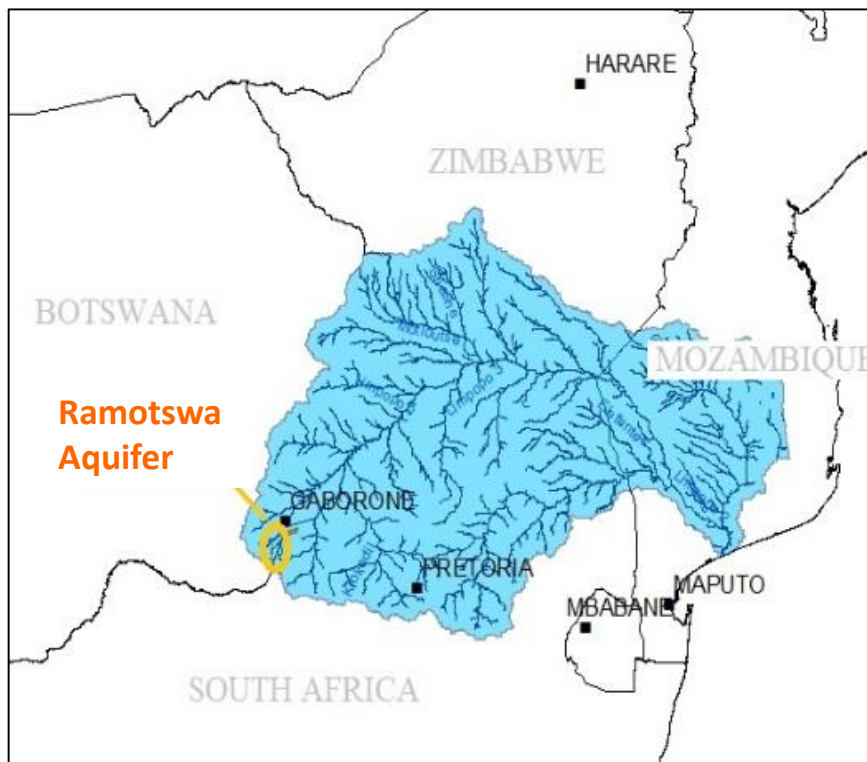
RESILIM plans to consolidate its work in this area through support to CDS-ZC in establishing a “Mangrove Ecosystem Resource Center” and implementing the communication strategy developed in Year Three to secure on-going awareness of the importance of mangroves to the local ecosystem and livelihoods. RESILIM will support the Centre in the establishment of a nursery for cultivating trees for dune-stabilization for further protection of the Limpopo River estuary. The trees will also provide a long-term sustainable supply of firewood for the local communities, thus relieving the pressure on the mangroves. To encourage community members continued support for the mangroves restoration, CDS-ZC is planning an incentive scheme in which fruit trees will be provided to local people who contribute to re-planting of the mangroves, the nursery will also be used to grow these trees. In the process of providing this support RESILIM will seek to improve the capacity of CDS to seek funding for their long term mangrove rehabilitation plans.

¹⁴ PhytoTrade is a non-profit organization that links the producers of natural product producers with different markets for export. The association aims to promote sustainable production and fair trade that will contribute to the economic development of southern African countries. Some of these natural products include beverages, cosmetic oils, health care products, herbal teas, jams, nutritional supplements and medicinal products.

1.4 Shared transboundary aquifer resources

Linked to the surface water resources of the Limpopo River, major transboundary groundwater resources exist in the region. These could support sustainable development, drought and flood resilience, urban expansion as well as small-scale agriculture if properly and conjunctively developed, shared, recharged, and managed as part of ongoing joint collaboration between the states. However, historically, the underground water resources have been accorded less attention as part of international, integrated and conjunctive water development planning, and if developed, their development has been approached unilaterally, by each state individually without due recognition of the transboundary character and potential implications of their use.

Water is quickly becoming a limiting factor for development in the border region between South Africa and Botswana. The Botswana side is dominated by urban development with high economic growth and population increase. Infrastructure has been able to keep up with urban growth in the country, through the Gaborone Dam and a couple of long-distance water transfer schemes from northern parts of the country, as well as from South Africa. However, recurrent escalating droughts are increasing demand. The South African side is characterized by stalling economic growth, mostly rural settlements with unaddressed issues of water supply needs for basic and economic needs. It relies heavily on groundwater with irrigation schemes presently using large amounts of pumped borehole water. Also, the dolomite aquifers in the North West Province receive considerable interest from national water planners because of rising water demands on the South African side.



Map: The Ramotswa aquifer is located in the upper part of the Limpopo River Basin and is one of the major transboundary groundwater resources in basin, being shared between Botswana and South Africa. The exact extend of the aquifer is loosely defined, including the known dolomite areas, by existing surface geology maps. There is currently no knowledge of the aquifer's size and storage capacity, the different compartments and connectivity between the compartments, its present use, the recharge process and the water quality

1.4.1 Researching the Ramotswa Aquifer

To better understand ground water resources, specifically, the potential of the transboundary Ramotswa Aquifer for climate resilience in the basin, RESILIM partnered with the International Water Management Institution (IWMI) to develop a scientifically informed, integrated and participatory strategy for how to solve some of the demographic, institutional, and climate-related water issues of the region, with a focus on what the internationally shared aquifer can provide in terms of sustainable, equitable and socially acceptable solutions.



Technical presentation delivered that promotes climate change adaptation



This project is co-funded between RESILIM and the CGIAR Research Program on Water, Land and Ecosystems (WLE)¹⁵.

Regional workshop:

In July 2015, RESILIM and IWMI, together with the South African, Botswana and Namibian governments, and the UNESCO International Hydrological Program's (UNESCO-IHP) Groundwater Resources Governance in Transboundary Aquifers (GGRETA) projects, hosted a regional meeting on *Tools for the Sustainable Management of Transboundary Aquifers in Southern Africa*. This was the first time countries in the Southern Africa region convened to engage in a broader dialogue on their shared groundwater resources. The meeting was devoted to the Transboundary Ramotswa Aquifer inception meeting and a stakeholder consultation on the Stampriet Transboundary Aquifer System, shared between South Africa, Botswana and Namibia.

The meeting promoted transboundary aquifer management and cooperation in Southern Africa. Current knowledge on the Ramotswa aquifer and the objectives of the project was shared with the stakeholders. Input from the stakeholders and the lessons learned shared by the Stampriet Transboundary Aquifer System project, allowed for the development of a joint workplan for the exploration of the Ramotswa Aquifer.



Above: A total of 60 participants at the workshop represented the governments of South Africa and Botswana, the Water Resources Council, UNESCO, AMCOW, IAH, Stockholm International Water Institute, IGRAC, CGS, SLR, DIRCO, USAID and others.

¹⁵ WLE is a global research-for-development program working through partnerships to provide sustainable solutions for people and societies. The program works to ensure that agricultural intensification benefits smallholder farmer livelihoods, is sustainable and makes use of the services provided by ecosystems. It aims to tackle key global challenges related to water scarcity, climate variability and environmental degradation and work from farm to landscape scale. See more at: <https://wle.cgiar.org/>

In Year Four, the RESILIM and IWMI partnership will conduct a socio-economic and institutional assessment around the aquifer area, it will develop hydrological maps of the aquifer area, and conduct training in shared and harmonized management and monitoring of the groundwater resources and geophysics.

Through this research RESILIM is supporting the Joint Permanent Technical Committee (JPTC) to create a joint long-term vision that will initiate cooperation between South Africa and Botswana on the shared groundwater resources of the upper Limpopo region.

The results from this analysis are likely to facilitate joint management and better groundwater governance focused on coordination, scientific knowledge, social redress and environmental sustainability, in order to reduce poverty and inequities and to increase prosperity, livelihoods and food security in face of climate change and variability.

The JPTC was formed through a bilateral agreement between South Africa and Botswana to look at cross border water quality issues, water hyacinth management, and the investigation of the potential of the Ramotswa Aquifer.

1.4.2 A signature initiative for the USAID Global Development Lab

In September 2014, RESILIM and IWMI met with representatives from USAID Southern Africa, USAID's Global Development Lab¹⁶ (Lab) and others from the private sector to propose the exploration of the Ramotswa aquifer as a signature water-related initiative that can be implemented as part of the development of a Science, Technology, Innovation and Partnership project. A second workshop took place in December 2014 with USAID Southern Africa, the Lab and a robust group of representatives from the public and private sector to develop the concept note. A proposal for the second phase of the exploration of the Ramotswa Aquifer initiative is being developed by IWMI, in consultation with RESILIM and once complete will be submitted to USAID.

¹⁶ The USAID Global Development Lab is a new entity within USAID that seeks to increase the application of science, technology, innovation and partnerships to achieve, sustain and extend the Agency's development impact to help hundreds of millions of people lift themselves out of extreme poverty.

1.5 Building resilience at sub-catchment level in the Marico Catchment

In Year Three RESILIM partnered with MRCA¹⁷ in the Marico Catchment of the basin to build sub-catchment level capacity to address biodiversity and climate change-related issues.

The Marico River is the lifeblood of the Marico Catchment. At the confluence with the Crocodile River it gives rise to the Limpopo River. The Marico River is one of the very few unmodified and natural rivers in South Africa. The Marico River supplies pristine water to an extensive crop and cattle industry, and farm households and rural communities derive their drinking and household water directly from the river. The Molatedi Dam is the sole supplier of water to the Madikwe Game Reserve, the fifth largest game reserve in South Africa. The protection of this water source the ecosystems in the surrounding area is thus essential for the climate-resilience of the Marico and downstream catchments.

The RESILIM program aims to build the capacity of institutions at sub-catchment level across the Limpopo River Basin to better address issues of climate resilience, biodiversity conservation, livelihood diversification and improved water management.



68 Firefighters

trained to mitigate threats against biodiversity and improve the biophysical condition of the area



33 Project Managers

trained in natural resources management and biodiversity conservation practices



226 youth

attended camps on climate change, water conservation, and water resource management best practices



Map: The Marico catchment in the Limpopo River Basin

¹⁷ The MRCA is a rural community-based organization that implement biodiversity conservation and sustainable development efforts in the upper reaches of the Marico River. The association's approach is the education of the community in biodiversity conservation best practices and the establishment of systems to prevent further degradation and harm to nature, while also providing an income.

1.5.1 RESILIM supports the establishment of the Marico Biosphere Reserve

RESILIM is supporting the MRCA with the application for a 60 000 hectares Marico Biosphere Reserve. In August 2015, RESILIM accompanied MRCA to the North West Parks Board to submit an application on behalf of 35 landowners for a protected area of over 19 674 hectares that will serve as the core area of the proposed Marico Biosphere Reserve.



1.5.2 Fire management to mitigate threats to biodiversity

RESILIM, through its partnership with MRCA trained 68 community members in South African Qualification Authority¹⁸ (SAQA) accredited courses, *Suppressing Wildfires* and *Basic Safety in Combating Wild Fires* to mitigate the threats wildfires pose to biodiversity in the region. Prior to the training, farmers used to gather untrained volunteers to fight the fires.



Above: RESILIM and MRCA trained 68 members of the Marico Community in firefighting to help mitigate the threat wildfire pose to biodiversity.

Every year the Groot Marico area suffers the wrath of wild fires, destroying biodiversity in the area. Although fire in the ecosystem is an ecological process and plays a fundamental role in sustaining biodiversity, if fire occurs too frequently or too seldom, or is too severe, it may result in ecosystem degradation¹⁹. Emergent farmers lose their livelihoods, commercial framers lose livestock, fodder banks, machinery and equipment, and the ecotourism industry loses resorts and wildlife. Local communities also suffer periodically from the loss of important resources such as thatch grass, due to wildfires.

¹⁸ SAQA is an official body appointed by the ministers of Education and Labor to oversee the development of the National Qualification Framework (NQF) in South Africa. The NQF is the set of principles and guidelines by which records of learner achievement are registered to enable national recognition of acquired skills and knowledge, thereby ensuring an integrated system that encourages life-long learning (Available at www.eaab.org.za/download.php?data_id=159).

¹⁹ Forsyth et al. 2010. *National Wildfire Risk Assessment: Analysis of Exposure of Social, Economic and Environmental Assets to Wildfire Hazards in South Africa*. CSIR. Page: 9. [Online]: Available at: http://www.nda.agric.za/doaDev/sideMenu/ForestryWeb/webapp/Documents/Wildfire_Risk_Report_v11.pdf. Accessed: 16 July 2015]

Through an analysis of the exposure of social, economic and environmental assets to wildfire hazards in South Africa, CSIR mapped the risk of wildfires in the country.

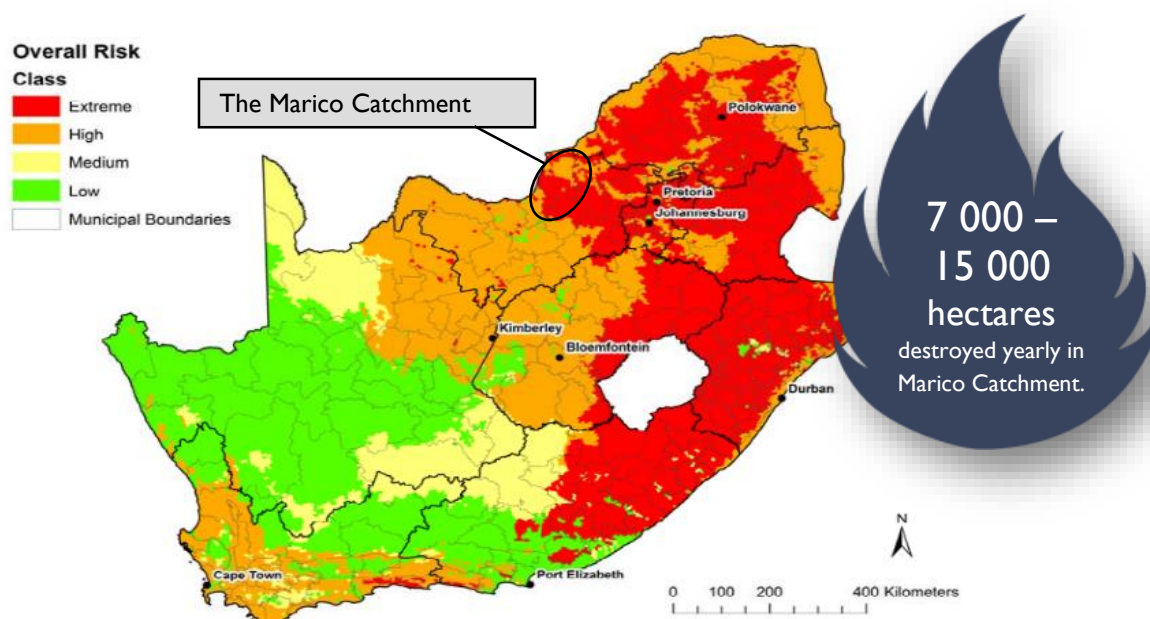


Figure: Overall assessment of wildfire risk levels in South Africa



Climate change will influence the future occurrence of wildfire, as increasing temperatures and increased drought frequencies combine to exacerbate the incidence of fire risk.



Alien invasive species create a fire-related hazard, which increases environmental vulnerability to inappropriate wildfires. Wildfires can create conditions favorable for the multiplying of alien invasive plant species

1.5.3 Building the capacity of project managers for resilient ecosystems

The MRCA currently works on a number of conservation projects such as the clearing of invasive species, wood shavings production, biocharcoal production, water conservation, fire management and others.

RESILIM and MRCA developed a project management training that includes resilience-thinking and aspects of climate change adaptation for improved decision making. With an increase in climate-related impacts a need was identified to increase the knowledge of MRCA's project managers on climate change concepts, causes, impacts and possible adaptation measures, to improve their decision making capacity and strengthen ecosystem and livelihoods resilience in their projects. These individuals currently manages projects such as invasive species clearing, youth camps and training, walking trails clearing, firefighting, maintenance, and biodiversity restoration. In the future it is planned that they will become employed as conservation managers or entrepreneurs in the proposed Marico Biosphere Reserve.

The MRCA and RESILIM recognized that these project managers can strengthen the resilience of the natural environment and the community through a better understanding of the impacts of climate change and how each of their projects build resilience in the area. For example, the clearing of invasive species allows for healthier ecosystems, and livelihoods are diversified through the production and selling of wood shavings and biocharcoal from the alien trees. An increase in knowledge also allows

for stronger leadership and adequate responses to their team members during operations, and the transfer of knowledge and skills.

Thirty-three project managers were trained over three days to better understand climate change and strategies for building resilience to climate-related impacts. This allows for improved decision-making during project management and knowledge and skills transfer to team members in climate adaptation strategies such as rain water harvesting, grey water systems, planting of indigenous plants, the clearing of invasive plant species, change in water patterns at home, and others.

A pre-training survey of the project managers indicated a limited knowledge of climate change concepts. In a post-training survey the trainees indicated a better understanding of climate change and improved skills for better decision-making during the implementation of their various projects. The trained project managers also recommended in the post-training survey that the training should be extended to their project team members.

1.5.4 RESILIM invests in a resilient youth

RESILIM and MRCA hosted over 200 youth from local schools over a series of eight nature conservation youth camps to raise awareness about climate-related issues and the importance of water and ecosystem conservation through educational classroom and hands-on field activities on topics. This included presentations on climate resilience, water conservation and water resource management best practices such as grey water systems, understanding healthy ecosystems through an increase in knowledge of food chains; how macro-invertebrates can be an indication of river health, and more.

Feedback from the youth following the camp indicated a dedication to ecosystem conservation and better water conservation practices.

“We see children educating adults about what they were taught at the youth camp. The message of climate change is driven by nature itself. The children were told about climate change, and they are now experiencing the actual impacts in Groot Marico, seeing it for real”.

~ Daan van der Merwe, Managing Director at MRCA



Component 2: Conservation and management of ecosystems improved

2.1 Building resilient protected areas in the Limpopo River Basin

The Limpopo River Basin has one of the highest percentages of protected areas in southern Africa²⁰. It is home to the Great Limpopo Transfrontier Conservation Area (GLTFCA) and the Mapungubwe Transfrontier Conservation Area (TFCA), including other protected areas such as the Pilanesberg, Waterberg and Madikwe national parks and other private game farms in South Africa; the Matopos National Park in Zimbabwe; and Banhine National Park in Mozambique.

²⁰ <http://www.limpoporak.com/en/river/ecology+and+biodiversity/biodiversity/biodiversity+resources.aspx?print=1>

2.1.1 RESILIM at the 6th IUCN World Parks Congress

The IUCN World Parks Congress took place November 12 to 19, 2014 in Sydney, Australia. This decennial Congress brings together biodiversity conservation actors from around the world. The theme “Park, People, Planet: Inspiring solutions”, advocated for a new era where protected areas are valued as holding natural solutions to some of the world’s most pressing problems.



5
technical
presentations
delivered

At the Congress, RESILIM presented two ePosters²¹ which focused on the Makuleke land in the Pafuri TFCA area on how community land within protected area could reap benefits for the community, and how community conservation areas can sustainably fund conservation efforts, while at the same time enhance community development. See Annex Four for the two presentations.

RESILIM supported the participation of Mr. Lamson Maluleke, a Park Manager of the Makuleke Contractual Park in the GLTFCA. Mr. Maluleke participated in a panel discussion on “*Power Dynamics, Land Tenure and Conflict*” and delivered three presentations using the Makuleke Community as a case study:

1. Tourism as a nature based solution: a case study of the Makuleke community in the northern most part of the Kruger National Park (KNP) and of South Africa.
2. Tourism in Transfrontier conservation areas, a vehicle for development and sustainable life.
3. Making tourism work for protected areas and sustainable development: Makuleke tourism initiatives within the Makuleke Contractual Park.

²¹ An ePoster utilizes a large monitor and computer to display multimedia versions of a poster. It gives an opportunity for a computer savvy presenter in the poster session to more effectively convey information that would not necessarily be possible with a traditional printed poster

Key learnings from Mr. Maluleke:

1. Healthy parks or protected areas make for healthy people

“It is my professional opinion that conservation and park management can proactively save more lives, prevent more diseases and promote more public health than the public health sector can achieve”.

~Dr. Jonathan Patz, at the World Park Congress, 2015

2. The deployment of good governance and benefit sharing making mechanisms within these parks and or protected areas is essential for the future of parks and protected areas.

3. The future of our parks and protected areas are much depended upon the extent to which communities are participating or are involved in the day to day management of these parks or protected areas. Currently, local communities and indigenous people are not regarded as equal partners to the

“I see no future for parks unless they address the needs of communities as equal partners in their development”

~ Former president of South Africa, Nelson Mandela, at the Durban IUCN World Parks Congress 2010

management of parks or protected areas and their traditional knowledge system, cultural practices and governance are not being fully harnessed in ecosystem management hence they are being regarded as peripheral issues. This is despite of the fact that most of these communities or indigenous people had to forego their land, and to some degree by force, for the sake of these parks and protected areas.

“The Makuleke Contractual Park through the Makuleke Joint Management Board declares its support to the objective of RESILIM to implement the Windhoek Statement²² and call for “a new regional vision and strategy for protected areas in southern Africa to be developed to help ensure the resilience of protected area governance systems.”

~ Lamson Maluleke,

Park Manager of the Makuleke Contractual Park

²²In preparation for the 6th World Park Congress in Australia, the IUCN convened a high level dialogue in Namibia which RESILIM attended. Participants developed the Windhoek Statement that was presented by IUCN at the World Parks Congress.



Top left: Mr. Maluleke presents on how tourism is a nature based solution for building resilience of people and ecosystems in and around protected areas, using the Makuleke Community as a case study. **Top right:** RESILIM Biodiversity Activities Manager, Steve Collins, presents on opportunities and challenges regarding funding of community conservation areas, and the findings of an assessment of the benefits and challenges over the past 15 years in Makuleke Community, in the Kruger National Park.

Bottom left: Mr. Lamson Maluleke (left) and Ms. Grazia Borrini-Freyerabend, Global Coordinator of the Indigenous Peoples' and Community Conserved Areas (ICCA) consortium. The ICCA Consortium is an international association dedicated to promoting the appropriate recognition of and support to Indigenous Peoples' and Community Conserved Areas and Territories. **Bottom right:** Attendees listen intently at the side-event RESILIM and SAREP hosted on Human-Wildlife conflict and integrated landscape planning,



Top left and right: RESILIM, SAREP and SADC's TFCA Unit shared an exhibition stand to interact with global delegates.

2.1.2 Bringing the World Park Congress key messages to Southern Africa

Following the Congress, RESILIM convened an organizing committee, made up of NGOs and other funders working with Protected Areas, including the SADC TFCA program, in January 2015 to discuss the outcomes of the process for taking the messages from the Congress to the southern African countries ahead of the IUCN African Conservation Forum in Nairobi in October 2015.

See Annex Five for the key messages and the cross-cutting themes from the World Parks Congress 2014.

2.1.3 South Africa World Parks Congress feedback workshop

The South African National Department of Environmental Affairs (DEA), with support from RESILIM, the IUCN, and Animal Health for the Environment and Development Great Limpopo Transfrontier Conservation Area (AHEAD-GLTFCA), convened a two-day workshop with the aim of assessing the relevance of the main outcomes of the IUCN World Parks Congress held in Sydney in November 2014 for South African conservation plans and programs.

Thirty-one representatives from government, NGOs, communities, and the private sector began to create a new national social compact for conservation in the country within the framework for the development of a ten year protected areas and conservation action plan. The first day provided context and background information with presentations from all sectors. The second day focused on understanding the WPC outcome and reviewing and identifying gaps in the current conservation programs and plans.

The participants identified a number of gaps in South Africa's current plans for protected areas which should be addressed in order to align the plans with the outcomes of the WPC. For example, there is an absence of climate change adaptation scenarios in current park management plans, and there is a need for more youth involvement through environmental education programs to become biodiversity monitors, receive training in biodiversity-related skills, and be involved decision-making. DEA committed to working with stakeholders at the workshop and others to address these gaps and to formulate a ten-year plan which will meet the commitments made at the World Parks Congress in 2014.

There was a lack of commitment and interest from the other three basin countries and RESILIM and IUCN agreed that it would not be worth going ahead with hosting workshops without in country buy-in. RESILIM is now working on getting the WPC outcomes implemented on some of RESILIM projects linked to protected areas such as the GLTFCA Livelihoods Diversification Strategy.



Front row, from left to right: Kule Chitepo (RESILIM); Janina Laurent (SADC TFCA Unit); Steve Collins (RESILIM); Christine Mentzel (IUCN).

Back row, from left to right: Kristina Berglund (Peace Parks Foundation); Piet Theron (Great Transfrontier Park and Conservation Area); Steve Johnson (SAREP); Dani Ndebele (Resource Africa). Clara Bocchino (AHEAD) attended via telecom.

2.1.4 Building resilient livelihoods in and around the Great Limpopo Transfrontier Conservation Area

In Year Three RESILIM partnered with the Peace Parks Foundation (PPF) to develop a livelihoods diversification strategy that will conserve biodiversity and improve the sustainable management of high-priority ecosystems, while improving livelihoods in and around the GLTFCA, as well as build the capacity of stakeholders to sustainably manage water and ecosystem resources through:

- Improved natural resource management practices that mitigate threats to biodiversity;
- Improved ecological integrity and resiliency to climate change in key/priority conservation area;
- Increased integration of climate change adaptation and biodiversity conservation in the basin water and resource management plans;
- Improved capacity of government, and other stakeholders, to strengthen trans-boundary management, integrated water, ecosystem management, climate change adaptation policies and strategies; and
- Increased knowledge and awareness of climate change impacts and adaptation measures.

RESILIM and PPF hosted an inception workshop to share with stakeholders the project plan for the development of the strategy for better resilience of the GLTFCA. The workshop brought together 18 key stakeholders and experts from Zimbabwe, Mozambique and South Africa to provide input and inform decisions on the planning of the initiative.

Other extensive stakeholder engagements took place over the past year. In October 2014, RESILIM's support to the GLTFCA and the methodology for the development of the proposed livelihoods diversification strategy were presented at stakeholder meetings in Zimbabwe, Mozambique and South Africa. In February 2015, RESILIM presented the proposed work at the *Land Reform and Biodiversity Stewardship Learning Exchange* in Pietermaritzburg, South Africa as well as the Kruger 2 Canyon Wildlife Economy Indaba in Acornhoek, South Africa.

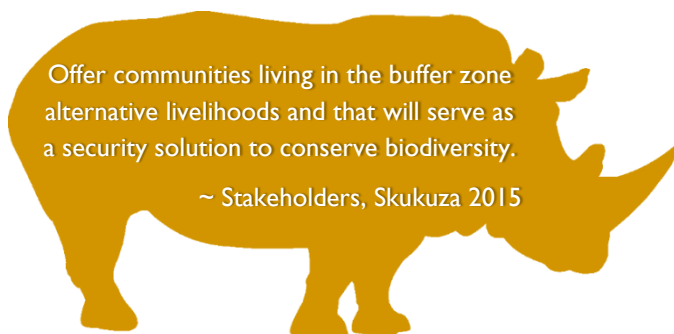
The GLTFCA was identified as a priority area for investment for improved climate resilience by the RESILIM Risk and Vulnerability Assessment due to its high biodiversity asset, the aquifer at the junction of the three countries and the potential threats posed by climate change predictions.



Above: Stakeholders and experts at the inception workshop for the development of a livelihoods diversification strategy for the GLTFCA, were given the opportunity to provide input on the work plan and indicate what information and data would be needed by the experts to develop the strategy be acquired by a scoping exercise.

Offer communities living in the buffer zone alternative livelihoods and that will serve as a security solution to conserve biodiversity.

~ Stakeholders, Skukuza 2015



Other achievements:

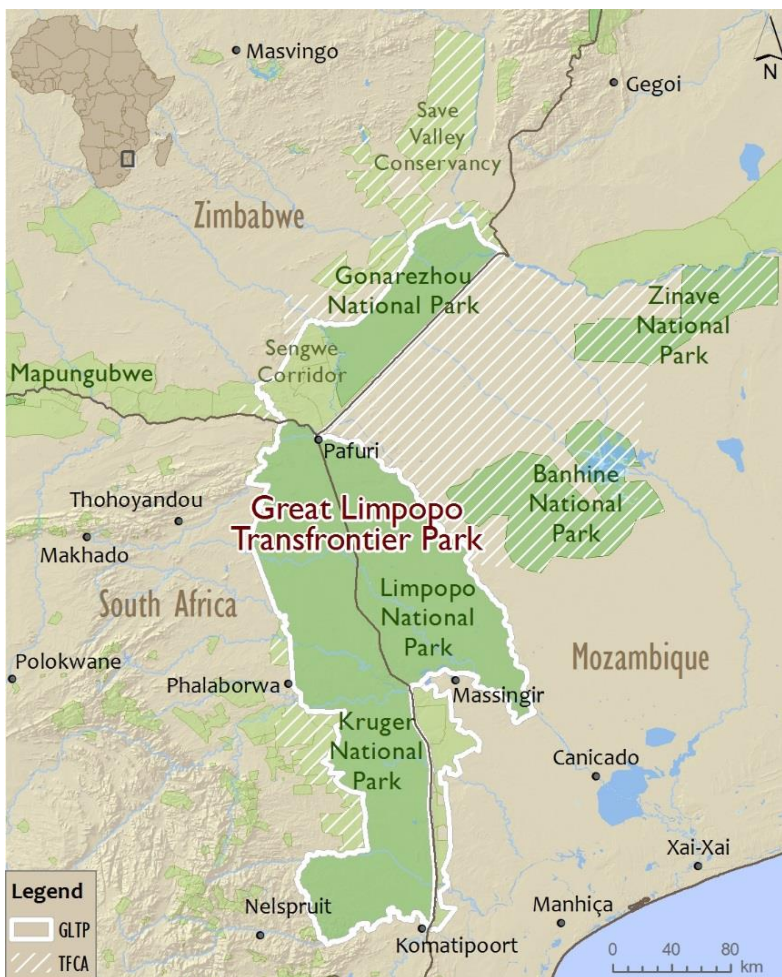
At the *Land Reform and Biodiversity Stewardship Learning Exchange*, RESILIM managed to have climate change adaptation included as an element for future stewardship plans and biodiversity-related decisions.





Transfrontier Park is an area across international borders with the primary focus of wildlife conservation. Authorities responsible for the respective areas formally agree to manage the areas as one integrated unit according to a streamlined management plan. The authorities also undertake to remove all human barriers within the park so that animals can roam freely.

Transfrontier Conservation Area is a cross-border region whose different component areas have different forms of conservation status such as national parks, private game reserves, communal natural resource management and even hunting concession areas. The areas border one another, even if separated by fences, highways, railway lines or other form of barriers, but are jointly managed for long-term sustainable use of natural resources.



The Great Limpopo Transfrontier Park is a joint agreement between the countries of Mozambique, South Africa and Zimbabwe comprising of the:

1. Limpopo National Park (Mozambique),
2. The Kruger National Park and Makuleke region (South Africa),
3. Gonarezhou National Park, Manjinji Pan Sanctuary, and Malipati Safari Area (Zimbabwe).

Size: 3.5 million hectares (*Size of the Netherlands*)

The Great Limpopo Transfrontier Conservation Area includes other protected areas not officially part of the Greater Limpopo Transfrontier Park, but managed in various forms of conservation or sustainable natural resource use as well as community and private land with complimentary land uses.

These other areas include the Zinave National Park, Banhine National Park, Corumana and Massingir development areas, including other private and provincial wildlife reserves on the Mozambican side of the Kruger National Park, and the Save, Malilangwe and other conservancies and community wildlife areas adjoining Gonarezhou in Zimbabwe.

Size: 10 million hectares

Source: Peace Parks Foundation

2.1.5 RESILIM supports WWF with development of communications plan to raise awareness

In 2014 the Zambian government approved the development of a large scale open pit mine by an Australian mining company in the Lower Zambezi National Park, a protected area of biological significance in southern Africa. Civil society is challenging the government's decision in court. If the development of the mine goes ahead, it wouldn't not only cause irrevocable damage to the environment, but also set precedence in the country and the region that could lead to the destruction of protected ecologically sensitive areas. The threat of increased mining activity in protected areas is a reality in the rest of southern Africa, including the Limpopo River Basin.



Communications plan

developed that promotes ecosystem conservation



Information and Education

materials developed



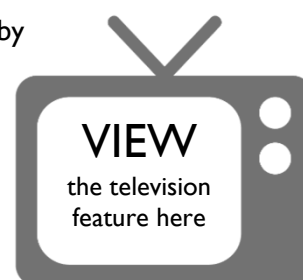
Workshop

hosted with Civil Society Organizations

Protected areas (PAs) are conservation management tools designed to safeguard the world's most threatened species and protect essential ecosystem services and biological resources.²³ Although often imperfectly designed, PAs can legally enforce at least a degree of protection, making them the cornerstones of most national and international conservation strategies. However, despite these restrictions there is growing concern about the adverse impact of extractive industries on biodiversity in PAs. Conservation designations and international standards alone do not ensure PA management effectiveness, biodiversity protection or an increased contribution to poverty reduction.

RESILIM therefore supported WWF Zambia with the development and implementation of a communication initiative that would re-ignite public debate so that the mining-conservation conflict receives wider publicity at different levels in the period leading to the court hearing. RESILIM saw its support to WWF Zambia as an opportunity to learn lessons for similar future scenarios in the Limpopo River Basin.

The implementation of the plan by WWF Zambia stimulated public debate by airing the voices of traditional leaders and local residents on their views on the proposed mine in main stream media, and reignited and catalyzed media interest in the court hearing. Articles and interviews featured in the regional Mail and Guardian newspaper, the Zambian Daily News, and Zambian Muvi TV.



RESILIM and WWF-Zambia strategically collaborated with Zimbabwean Civil Society Organizations (CSO) who has similar interests in maintaining the ecological integrity of the Zambezi River Basin by providing a platform, in the form of a workshop, for the articulation and dissemination of the environmental and other risks associated with the proposed mines to be communicated to key policy and decision makers in Zimbabwe. The workshop was attended by representatives of 40 CSOs in addition to individuals, government representatives and a representative of Zambian CSOs.

The court date has been postponed until further notice.

²³ Chevallier, R, 2015. Safeguarding Africa's Natural Heritage: The Case of Mining in Protected Areas. *Policy Insights*. [Online]. Available at: http://www.saiia.org.za/doc_view/811-safeguarding-africa-s-natural-heritage-the-case-of-mining-in-protected-areas. Accessed: 30 September 2015.

Did you know ?

There are 200 000 Protected Areas world wide

7 000 Protected Areas in Africa

of which 41 is listed under UNESCO World Heritage site status

Yet, the world is increasingly experiencing a loss of biodiversity

70% of the world's coral reefs are threatened or destroyed

18 700 of the world's 52 000 species are threatened by extinction

75% of the world's fisheries are fully or over exploited

2.1.6 Building the resilience of wetlands and wildlife in Botswana

In March 2015, RESILIM's Chief Scientist participated in a panel discussion on climate change that looked at emerging climate-related issues that threatens wetlands and wildlife in Botswana. The three-day Botswana Symposium on Wetlands and Wildlife 2015, themed "Natural Resource Research: Implication for management and conservation" was hosted by the country's Department of Wildlife and National Parks and the University of Botswana in Maun, Botswana.

RESILIM took the opportunity to bring forth the process and findings of the program's risk and vulnerability assessment of the Limpopo River Basin. Calling for the protection of high altitude sub-catchments to improve water security, the improvement of water quality, and the building of resilient systems and institutions through the use of the socio-ecological systems identified in RESILIM's risk and vulnerability assessment, were incorporated in the recommendations for building climate resilience in Botswana and across borders. See Annex Six for further recommendations from the panel for increased climate-resilience of wildlife and wetlands.

According to the panel, climate change manifests itself through changes in temperature and rainfall, with increasing temperature and low rainfall leading to drying of wetlands. An increase in temperature and decrease in rainfall also lead to rangelands and ecosystems degradation which impacted negatively on people's socio-economic status. The panel also highlighted other climate-related emerging issues in Botswana:

- There is a need for capacity development regarding the analysis and interpretation of data
- Different climate predictions calls for mitigation strategies that plan for variability
- Mitigation strategies should include short term and long term plans
- Botswana has failed to tap into solar energy, but it was acknowledged that the technology is expensive compared to fossil derived energy.

The panel concluded and recommended that human adaptation to climate change should consider wetland ecosystems.

2.1.7 RESILIM and partners at the World Forestry Congress 2015

RESILIM, working with the Man and Biosphere Program²⁴, identified and supported eight representatives from key civil society RESILIM partners to participate in the World Forestry Congress in Durban, South Africa. This six-yearly event is a key occasion for the world's foresters and forest conservation practitioners to gather, share their expertise and experience, and shape the policy agenda for sustainable development and the future for forestry conservation. Through their participation and support to their eight partners, RESILIM was able to improve local institutional capacity to address threats to high altitude catchment areas as the participants were exposure to global best practices on forestry conservation. The participants were able to strengthen their networks and connections with other organizations and government departments working on forestry, conservation and water issues and establish links with possible funders.



Institutional capacity

built to address threats to biodiversity around high altitude catchment areas

"The importance of environmental services we derive from forests cannot be over-emphasized. These include biodiversity conservation, climate change mitigation and protection against desertification and land degradation, watershed services and tourism."

~ Mr. Senzi Zokwana, South African Minister of Agriculture, Forestry, and Fisheries



Above: RESILIM supported eight representatives from civil society groups to attend the World Forestry Congress. From left to right: Ntjipa Herman Mogashoa (People and Parks), Daniel Rakoko Motshegare (People and Parks), John Shiang Mathebe (People and Parks), Onkemetse Joseph (Kalahari Conservation Society), Steve Collins (RESILIM), Peter Tshisikhawe (Vhembe Biosphere Reserve), Dirk Wijnbeek (MRCA), Winners Mashego (Kruger to Canyons Biosphere Reserve), and Lucas Namanyane (Waterberg Biosphere Reserve).

Opportunities for building resilience:

In Year Four RESILIM will continue to work with DEA and the Man and Biosphere Program to identify opportunities to support the protection of high altitude catchment areas through possible partnerships within the region's biospheres.

²⁴ Launched in 1971, UNESCO's Man and the Biosphere Programme (MAB) is an Intergovernmental Scientific Programme that aims to establish a scientific basis for the improvement of relationships between people and their environments. MAB combines the natural and social sciences, economics and education to improve human livelihoods and the equitable sharing of benefits, and to safeguard natural and managed ecosystems, thus promoting innovative approaches to economic development that are socially and culturally appropriate, and environmentally sustainable (<http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/>)

2.2 Building capacity for improved water quality at sub-catchment level for a resilient basin

RESILIM responded to a request from Botswana DWA in Francistown to collaborate in increasing the resilience of the Francistown City Community by building their capacity to address water quality and pollution issues in the Tati River and better manage water and ecosystem resources.

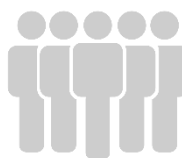
The Tati River in the northeast of Botswana provides water for domestic use to residents of Francistown – Botswana's second largest city. The river is also a tributary of the Shashe River, which in turn feeds the Limpopo River, and flows through the Greater Mapungubwe TFCA, providing water to critical ecosystems. As mentioned above, this TFCA is an area identified by RESILIM's Risk and Vulnerability Assessment as a highly vulnerable area of the basin where climate change is expected to put more pressure on an

already water scarce area. The protection of water resources, such as the Tati River, is thus critical for increased ecosystems functioning that could serve as a buffer to climate change impacts.

The partnership between RESILIM and DWA kicked-off with a stakeholder workshop in October 2014 with about 30 representatives from various government departments, the private sector, NGOs and civil society to sensitize stakeholders on the deteriorating condition of the Tati River. With RESILIM support, A Tati River Management Committee (TRMC) was established to drive a clean-up exercise and other conservation activities.

RESILIM supported the committee to meet on a monthly basis and to develop a work plan that promotes integrated natural resources management. The plan includes a clean-up exercise, awareness raising, and training with a focus on water and ecosystem management that will improve the resilience of the ecosystems and communities in the sub-catchment.

RESILIM also hosted a two-day workshop for 88 stakeholders in April 2015 where the work plan was refined and finalized. RESILIM's consortium partner, Overseas Strategic Consulting (OSC) was also present and provided communication expertise on possible communication mechanisms, activities and needs in preparation for the development of a communications plan. The RESILIM Monitoring and Evaluation Specialist also supported the workshop with guidance on the incorporation of monitoring and evaluation mechanisms.



Set up committee to improve water conservation and water demand management and implement climate change adaptation strategies



Developed a plan that integrates natural resource management for improved climate-resilience of people and ecosystems.



The “Tati River was one of the natural water resources we depended on for fishing, drinking and other activities. The river that we are talking about looks desolate. It is now dead like it never existed and marine life such as fish and frogs have disappeared. Only isolated patches of muddy pebbles and some vegetation can be seen in the river.”

*~ Resident of Francistown to a reporter
from Daily News*

Pollution poses a threat to the quality of both surface and underground water, and current pollution levels in the Tati River could, if unchecked, significantly increase the risk of an outbreak of water borne diseases such as cholera, typhoid and diarrhea.

In Year Four, RESILIM and DWA will train government officials and community leaders with a view to strengthen the capacity of the Francistown community on improved river management practices. Following the training there will be a river clean-up exercise with community volunteers to kick-start the rehabilitation of the Tati River. The event will raise awareness on environmental issues that have had a negative impact on the natural resources and livelihoods in and around the city, such as the illegal disposal of large quantities of solid and liquid waste into the river.

2.3 RESILIM support to the South Africa-Botswana Joint Permanent Technical Committee

2.3.1 Water Quality and Water Hyacinth Management

In Year Four, RESILIM continued its support to the Joint Permanent Technical Committee (JPTC) by facilitating a workshop in November 2014 to refine the draft action plan for joint water hyacinth and water quality monitoring. The JPTC is a sub-structure of LIMCOM, established through a bilateral agreement between South Africa and Botswana to address water quality and water hyacinth management issues between the two countries. LIMCOM has an obligation to “take all measures necessary to prevent the introduction of alien aquatic species into a shared watercourse” according to the SADC protocol on shared watercourse systems.



Above: Water hyacinth in the Hartbeespoort Dam. The workshop included a site visit to the Dam to raise delegates’ awareness and appreciation of the intensity of the water hyacinth infestation.

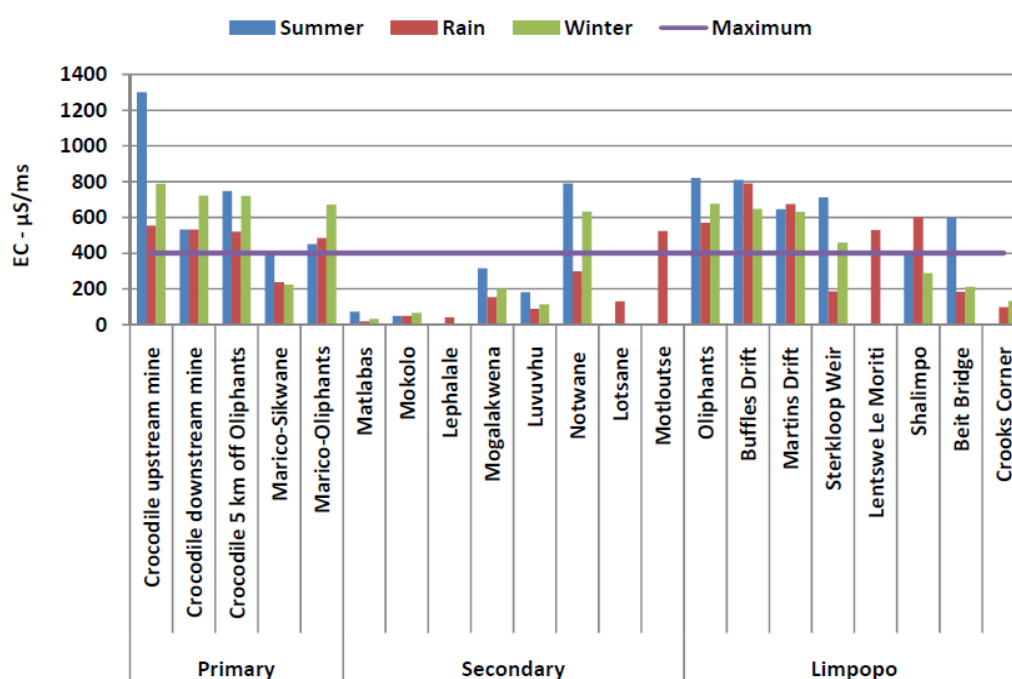
The action plan aims to deliver the impact needed to achieve and maintain good quality water resources and effective measures of water hyacinth management. The strategic objectives of the draft action plan are:

1. A joint monitoring program for water quality and water hyacinth management;
2. The jointly identification and monitoring of point and non-point sources of pollution in the Limpopo River for compliance; and
3. Joint communication, information and knowledge management strategies.

RESILIM facilitated a second workshop in May 2015 where the JPTC met to refine the water quality and water hyacinth management work plan, commence with the implementation of elements of the work plan, and strengthen the coordination mechanisms of the task team. The JPTC unpacked activities and possible interventions, such the development and harmonization of common standards between the two countries, bi-annual water quality monitoring, the utilization of digital imagery and other technology to capture land use and mapping sources of pollution, sensitization of all stakeholders to facilitate sampling, site visits, stakeholder identifications and analysis, and the development and the implementation of communications plan. See Annex Seven for the detailed work plan.

These strategic goals were identified following the findings of a joint survey to assess the state of water quality in the Limpopo River and its tributaries, including the assessment of water hyacinth spread and growth. Findings of the survey²⁵ indicated a tendency of pollution in the Marico and Crocodile Rivers in rainy seasons. High levels of potassium, phosphates, copper, manganese and lead were found in these rivers, which can have chronic and acute physiological effects on aquatic flora and fauna; and have the potential to change the ecological structure of ecosystem by eliminating species that are not tolerant to such changes. The chart below indicates that levels of nitrates and heavy metals in most of the Limpopo River's primary tributaries are above the maximum allowable limit, which in turn influences the water quality of the Limpopo River.

²⁵ The survey used an Electrical Conductivity test. Electrical Conductivity is a measure of the capability of water to conduct an electrical current. This capability is as a result of the presence of ions such as carbonate, bicarbonate, chloride, sulphate, nitrate, sodium, and others that carry an electrical charge, in water.



Above: An acceptable range for Electric Conductivity, meaning the presence of various nitrates and heavy metals, is between 0 – 400 $\mu\text{S/ms}$. The electrical conductivity in Primary Rivers is above the maximum allowable limit, except at Marico-Sikwane. As the primary rivers drain into the Limpopo River, high levels of various nitrates and heavy metals are found in the Limpopo River as well

The survey validated the concern expressed by the JPTC in relation to the presence, concentration and quantity of different chemical, physical and heavy metal matters in the Limpopo transboundary catchment between Botswana and South Africa. It was highlighted that these conditions promote the germination of invasive alien plants such as water hyacinth. Although only a few portions of the catchment show signs of pollution beyond acceptable norms, it is important to curb the problem before it worsens. The survey indicates that the most likely causes of these high levels of heavy metals and nitrates are mining effluents and the irrigation schemes of commercial farming. With water-thirsty industries in the basin already placing pressure on the availability of water, countries cannot afford the quality of the limited available water to be compromised.

2.3.2 Charcoal production from water hyacinth as a livelihoods diversification strategy

In August 2014, RESILIM and with Botswana DWA produced charcoal made from dried water hyacinth using and adapting a method developed by the Development Lab (D-Lab)²⁶ at Massachusetts Institute of Technology (MIT) for producing charcoal from agricultural and other waste plant material.

The method, which is low tech enough to be done by any rural resident with access to water, involves the carbonization of the water hyacinth in standard size metal drum and then briquetting it using a starch binder. No extensive tests were done at the time to determine the energy content or the amount of particulates it releases when burning, but the exercise established that the production of charcoal from dried water hyacinth was possible.



Above: a metal drum packed full of dried water hyacinth.

RESILIM reached out to Professor Amy Smith, founder of the D-Lab at MIT, who then with a group of her students travelled to Botswana in January 2015, to assist RESILIM and the Botswana DWA to improve the charcoal production method, produce a second batch of charcoal and to do initial energy value testing on the charcoal. The briquettes were taken back to MIT for further tests and the results showed that while the calorific value, in other words the energy content, of the produced charcoal was below that of normal charcoal, further development of the production method and testing would be worth pursuing.



Above: Officials from the Botswana Department of Water Affairs got their hands dirty and participated in the production of the charcoal.

²⁶The Development Lab has program that focusses on the development, design and dissemination of appropriate technologies for poverty alleviation and community development.

In Year Four RESILIM together with Botswana DWA will further assess the charcoal production process to determine if it could be a constructive use of the invasive weed. The next steps would include:

1. Report the exiting findings to the Botswana-South Africa JPTC and reach agreement on the need for further development and experimentation as well as their ownership of the process.
2. Identify suitable partners to do the testing, such as the University of Botswana, MRCA, Botswana DWA and South Africa DWS, MIT D-Lab and others.
3. Test the existing charcoal for particulates and Carbon Monoxide emissions.
4. Produce and teste charcoal made with water hyacinth combined with other feedstocks.
5. Documenting the success or failure of the experiment.

MRCA is considering the production of charcoal from water hyacinth.

More about water hyacinth:

Water hyacinth, which is native in South America, has spread throughout the world as it was regarded as a beautiful decorative water plant. The Limpopo River Basin has not been spared. Water Hyacinth flourishes in the nutrient rich and polluted parts of the Limpopo River and its tributaries. The invasive weed has become a nuisance in some areas of the basin where fishing is being disrupted and fish stocks have reduced due to the plant sucking up the oxygen in the water. Water hyacinth also clogs and damages irrigation pipes.

RESILIM observed that while both biological and mechanical controls are being attempted, water hyacinth will be a constant presence in many rivers for the foreseeable future until the pollution problems addressed and reduced.

There are, however, various uses for the invasive weed, including its use as a fuel source, paper fiber, furniture, compost and animal feed. Due to its ability to thrive in polluted and nutrient rich water it is now being used as a method to clean water and has become a feature of sewage treatment works.

2.4 Development of climate change response strategy for the savanna biome

The South African DEA completed a vulnerability assessment for the savanna biome as part of a country-wide climate change vulnerability assessment of the nine major biomes in the country. RESILIM responded to a request from DEA and partnered with the department to develop a climate change response strategy and action plan for the savanna biome and identify locations for pilot projects.

Various engagements between RESILIM and DEA concluded in an agreement that the strategy would:

1. Create an enabling environment, at national and provincial levels, for responding to climate change in the savanna biome, such as putting in place a policy and planning framework for climate change responses in the savanna biome;
2. Facilitate and showcase implementation of demonstration projects that apply ecosystem based adaptation principles while also responding in a positive way to climate change impacts and livelihoods in the savanna biome;
3. Support an effective communication strategy that builds and harnesses collaborative partnerships around biodiversity conservation, land degradation, research and development projects and ultimately climate change.

In Year Three a draft strategy was conceptualized and developed. RESILIM and DEA hosted one of three planned provincial stakeholder engagement workshops²⁷ to solicit input from stakeholders on the draft strategy also with a view to identify potential adaptation learning sites. RESILIM and DEA was also able to secure stakeholders' commitment to be part of an email-based survey that will allow final inputs towards the finalization of the strategy and pilot site suggestions.

In Year Four, RESILIM will continue to provide support to DEA to finalize strategy and identify adaptation pilot sites that could serve as examples for the entire savanna biome in the Limpopo River Basin.

See Annex Eight for the executive summary of the Draft Integrated Climate Change Response Strategy for the Savanna Biome.

2. 5 Mobilizing biodiversity data for improved ecosystem resilience

RESILIM co-hosted the four-day Africa Rising conference in Cape Town, on *Mobilizing biodiversity data for Sustainable Development*, together with the United Nations Environmental Program's World Conservation Monitoring Centre (UNEP-WCMC), South Africa National Biodiversity Institute (SANBI) and GBIF. This followed on an *Information and Data Management* workshop that took place in 2014 in Pretoria, South Africa, which RESILIM co-facilitated with the UNEP Regional Office for Africa.



Delivered a technical presentation that promoted the increased resilience of biodiversity and ecosystems

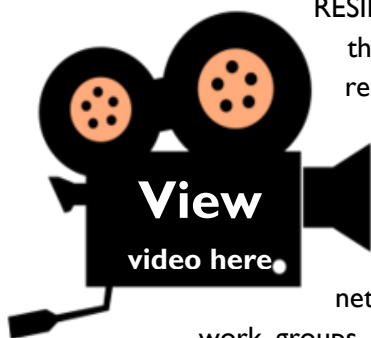


Distribution of science-based knowledge management materials



Supported the participation of basin stakeholders to build institutional capacity for improved ecosystem management

²⁷ The savanna biome in the Limpopo River Basin stretches into the Limpopo, North West and Mpumalanga provinces of South Africa. RESILIM and DEA plans on having stakeholder engagement workshops in all three provinces.



RESILIM and its consortium partner, OneWorld co-presented on the findings of the RESILIM Risk and Vulnerability Assessment and proposed recommendations for investment in the improved resilience of biodiversity and ecosystem in the basin.

Other presentations demonstrated opportunities and solutions that biodiversity data offer for sustainable development in Africa. These presentations drew attention to relevant tools, resources and learning networks for building effective biodiversity information systems in Africa. In

work groups, an action plan for mobilizing and mainstreaming Africa's policy-relevant biodiversity data was drafted. The purpose of the development of the action plan was to foster consensus around a set of goals, objectives and priority actions, thereby creating a framework for collaboration in Africa's community of practice. See Annex Nine for the plan of action.



Above: Ninety delegates from over 21 countries attended the Africa Rising Conference in Cape Town, South Africa from 19 – 22 May 2015.



Left: RESILIM Outreach and Communication Specialist, Lara Rall with her message for International Biodiversity Day 2015. Participants took photos that were shared on social media in celebration of this significant day.

Below: RESILIM Chief Scientist, Dr. Moleele presented the RESILIM Investment Strategy at the conference.



Participants also composed a Declaration on Biodiversity Information for Sustainable Development in Africa. In the Declaration, participants set out their common vision for 2030 as “a world in which biodiversity information contributes to sustainable development and climate-resilience in Africa. See Annex Ten for the Declaration on Biodiversity Information for Sustainable Development in Africa.

Below: At an exhibition, RESILIM distributed some of the scientific evidence generated by the program, such as the Mapping of the Mangrove Vegetation in the Limpopo River Estuary, the Economic Valuation of the mangrove ecosystems in the estuary, policy briefs to conference participants.



RESILIM also supported the participation of four delegates from the Limpopo River Basin.



“I believe the resilience can be strengthened in my country [Botswana] and Limpopo Basin through ensuring that data and information is always available to all stakeholders who will be involved in formulation of strategies for adaptation to the changes in conditions. The relevant climate and biodiversity information and data will need to be available to all those affected by climate change and those working towards strengthening resilience.

I gained knowledge on resources and possible partnerships for building biodiversity databases and information for sustainable development, and would like to replicate such partnerships within my own country,

I look forward to further work towards ensuring my country catches up where necessary, in the biodiversity information management arena. I am grateful to USAID and RESILIM for the support to attend the Africa Rising Conference.”

~ Kwashirai Chigodora - Environmental Statistician at Statistics Botswana

Biodiversity affects many aspects of people’s livelihoods and well-being, providing products such as food and fiber. If the products and services that biodiversity provides are not managed effectively, future options will become ever more restricted – with the poor often most directly affected by the deterioration or loss of ecosystem services, as they are the most dependent on local ecosystems, not able to pay for alternatives, and often live in places most vulnerable to ecosystem change.

At Rio+20 in June 2012, the United Nations Conference on Sustainable Development acknowledged that biodiversity data plays a critical role in sustainable development, and that access to relevant, reliable data is essential for effective policymaking. Mobilizing Africa's biodiversity data will help African policymakers to formulate more effective, evidence-based policies in pursuit of sustainable development and poverty alleviation²⁸.

2.6 Mozambique launches the first trust dedicated to biodiversity conservation – the BIOFUND

RESILIM and CDS-ZC, together with about 1200 participants and 500 youth, attended the launch of the BIOFUND, a trust that will play a major role in supporting the conservation of Mozambique's landscapes in 14 major ecological regions. One such ecological regions is the mangrove ecosystem.

RESILIM supported CDS-ZC's participation through the print and distribution of scientific evidence generated through the partnership, such as the mapping of the mangrove vegetation and the economic valuation of mangrove ecosystems in the Limpopo River estuary. Through sharing the findings, CDS-ZC was also able to make contact with international and national conservation and development partners, ambassadors, ministers, non-government organizations (NGOs), and dignitaries of Mozambique, as well as the BIOFUND itself. CDS-ZC was also able to interact with the youth from Maputo, a city where mangrove vegetation is heavily degraded²⁹.

An assessment on Mozambique's biodiversity and tropical forests by USAID³⁰ identified threats to mangroves in Mozambique as being the expansion of aquaculture infrastructure in mangrove forests and mud flats; oil, gas, and mineral prospecting; damming of major water courses that maintain the ecological balance of mangrove areas and coastal wetlands; unsustainable methods of fishing and overfishing; pollution from agriculture practices upstream; and ill-planned tourism facilities.



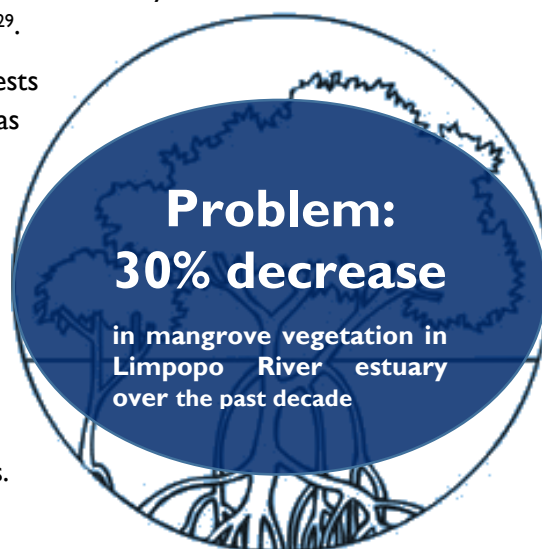
Left: The US Ambassador to Mozambique, Mr. Douglas M. Griffiths (far right) at the RESILIM and CDS-ZC exhibition during the launch of the BIOFUND in Maputo, Mozambique. On the left is Steve Collins (RESILIM) and Henriques Balidy (CDS-ZC) in the middle.



Distributed science-based knowledge management materials



Raised awareness to promote access and use of science based information for stakeholders



²⁸ General Assembly resolution 66/288, *The future we want*, A/RES/66/288 (27 July 2012), available from <http://www.uncsd2012.org/thefuturewewant.html>

²⁹ De Boer. W.F. 2002. The Rise and Fall of the mangrove forests in Maputo Bay, Mozambique. *Wetlands Ecology and Management*. 10: 313-322.

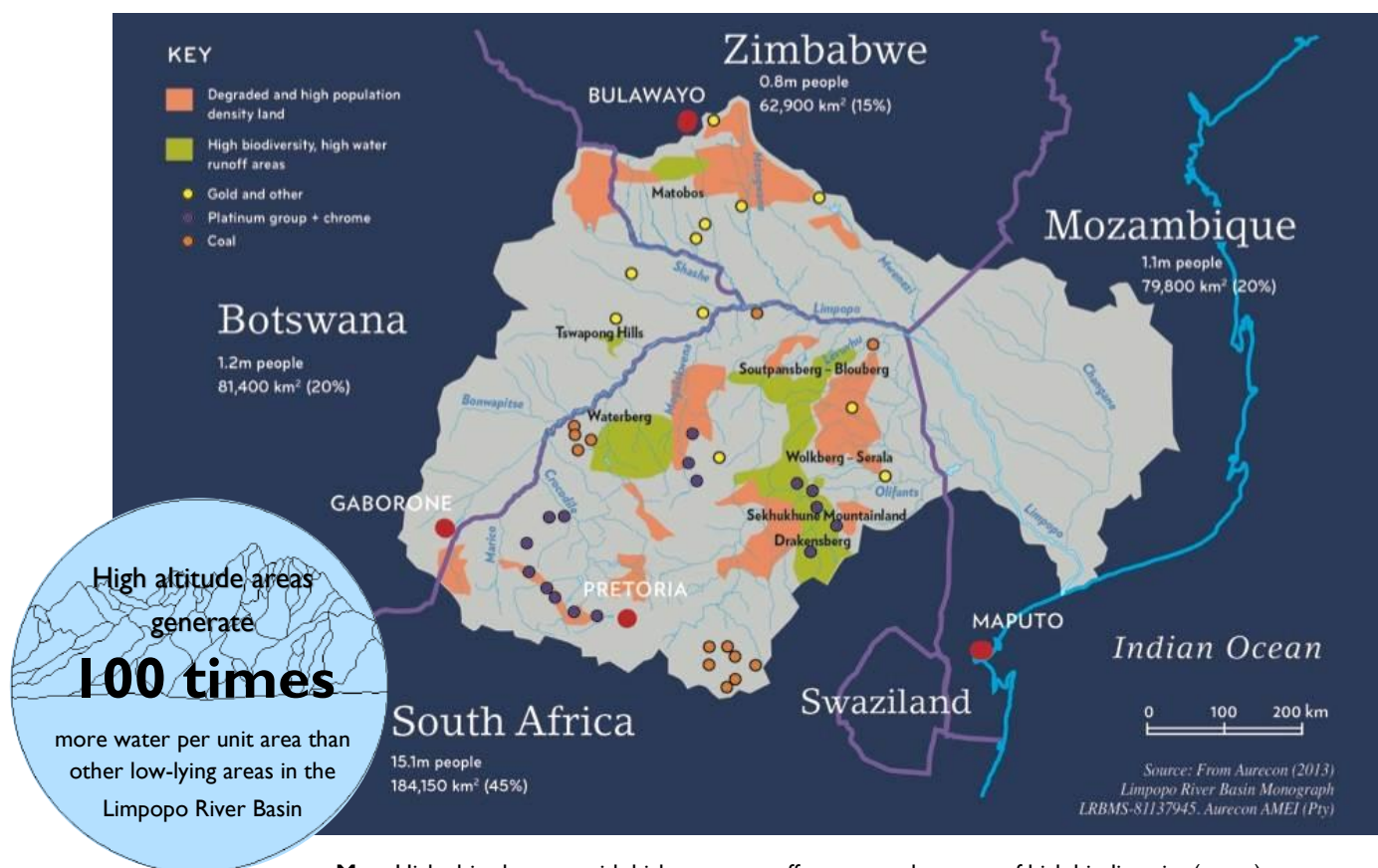
³⁰ United States Agency for International Development (USAID), 2008. Mozambique Biodiversity and Tropical Forests 118/119 Assessment. Available at: http://pdf.usaid.gov/pdf_docs/Pnadm936.pdf

2.7 Integrating resilience building into South Africa National Biodiversity Strategy and Action Plan

RESILIM assisted the South African DEA to revise and update its 2005 National Biodiversity Strategic Action Plan (NBSAP)³¹ by participating in the Second National Stakeholder Consultation workshop in April to ensure that South Africa prioritizes key areas for protection and increased resilience to climate change, as identified in the Risk and Vulnerability Assessment.

RESILIM, through its participation in the second stakeholder workshop as well as by commenting on drafts of the revision, is attempting to ensure the incorporation of climate change considerations, resilience building to climate change, and recommendations from the RESILIM risk and vulnerability assessment in the strategy and in the activities developed. One such recommendation is the protection of high altitude catchment areas, indicated in the map below, as they produce most of the water in the basin.

The NBSAP outlines the long-term vision for the state of biodiversity in South Africa and will guide government and non-government investment and interventions in building resilience of ecosystems in South Africa for the next ten years.



Map: High altitude areas with high water runoff areas are also areas of high biodiversity (green).

³¹ South Africa is a party in the Convention on Biological Diversity's (CBD). The CBD's 2011 – 2020 Strategic Plan for Biodiversity and Target 17 of the Aichi Biodiversity Targets requires Parties to the Convention to update and revise their NBSAPs.

Component 3: Capacity of stakeholders to manage water and ecosystem resources improved

3.1 Tools to improve knowledge, awareness of sustainable water management and climate change adaptation strategies and practices

3.1.1 Limpopo Basin Atlas: Our Changing Environment

RESILIM is partnering with the Global Water Partnership-Southern Africa (GWP-SA) and GRID-Arendal to develop an atlas that will not only highlight the complex socio-economic issues of the basin and their role in shaping changes in the basin, but also provide alternative suggestions to improve basin-wide cooperation and regional integration. It is also envisioned that the Atlas, which will be a comprehensive evidence-based knowledge management product, will support a number of regional plans and strategies and programs such as the SADC Regional Water Strategy, AMCOW's Strategic Framework on Water Security and Climate Resilient Development, WACDEP, and others by providing access to climate, ecosystem and water data and information and make the case for the climate resilience of people and ecosystems.

Atlas Themes:

1. State and trends of the of LRB environment
2. Extreme weather events in the LRB
3. Changing livelihoods in a changing environment
4. Transboundary water management – Opportunities for Sustainability

In Year Three the partners selected the Southern African Research and Documentation Centre (SARDC)³² to be the lead author on the development of the Atlas. As the lead author, SARDC will gather literature and data; analyze and visualize the specialist data such as satellite imagery; prepare maps and graphics; and secure national buy-in by sharing drafts with country stakeholders for review.

In Year Four a basin-wide technical review workshop will be held to validate the technical soundness of the draft manuscript, check data quality, and ensure consistency with running thread. Once the information has been validated, the production of the atlas, including technical editing; copy-edit; design and layout; and printing will take place. Other activities include the launch of the atlas, translation into Portuguese, online publishing and further stakeholder engagements.

³² SARDC is an independent regional knowledge resource center established in 1985 to strengthen regional policy perspectives and track implementation on a range of issues in southern Africa, and works in partnership at national and regional levels. SARDC is made up of topical institutes that focus on relevant regional processes, and has a long track record of achievements, in partnership with SADC and others.

3.2 Building institutional capacity for improved transboundary management

In Year Three RESILIM supported LIMCOM with an Institutional Capacity Needs Assessment to better understand LIMCOM's capacity needs and developed a plan for improving LIMCOM's capacity to improve the transboundary management of the Limpopo River Basin.

3.2.1 Institutional Capacity Needs Assessment:

In order to guide decision-making on the capacity development of LIMCOM and other institutions leading resilience activities in the Basin for improved livelihoods, river basin ecological health, and sustainable economic development, RESILIM saw the need to conduct an institutional capacity needs assessment in order to:

- Identify capacity needs of the institutions reviewed.
- Review how institutions undertake resilience capacity building in relation to climate change impacts.
- Identify existing opportunities within institutions for designing of interventions that build and strengthen resilience to climate impacts.
- Identify common challenges and opportunities for transboundary projects that enhance resilience capacities.
- Develop a capacity strengthening plan for transboundary institutional resilience building.

RESILIM's Institutional Development Facilitator consultant conducted a desktop study of institutional capacity needs in Zimbabwe, met with Botswana, South African and Mozambican stakeholders, including LIMCOM task team members and the LIMCOM Executive Secretariat, to better understand the institutional capacity needs and to develop an over-arching institutional Limpopo River Basin climate resilience strengthening framework to guide decision-making in the basin. The needs assessment sourced stakeholders' perspectives on immediate, short, medium and long term activities that can be carried out to build climate resilience in the basin in line with the risk and vulnerability in the Limpopo River Basin Investment for Resilience Strategy.

The capacity strengthening plan is targeted at all Basin custodian institutions and possible investors in capacity strengthening initiatives that would result in improved resilience across the system. The plan is underpinned by recent regional research, primarily the Limpopo Monograph study, the RESILIM Risk and Vulnerability Assessment and Systems Analysis, the LRB Investment for Resilience Strategy, which informs the identification of resilience building actions and priority resilience.

At the transboundary level, the primary beneficiary is LIMCOM, at the national level, the primary beneficiaries are the governments of the four riparian countries.

3.2.2 Outcomes of the Institutional Capacity Needs Assessment:

The capacity needs assessment identified the existence of robust national institutions that are able to fulfill their water mandates and are aware of the need to incorporate climate resilience in their activities. Furthermore, the national water policies and strategies indicate the integrated water resources management approach that needs to factor in at central and local governance structures the responses to climate impacts to ensure continued access to water, managing water related disasters and supporting socio-economic development in different sectors and livelihoods.

The needs assessment found that institutions at the national level are still to a large extent primarily focused on the core functional issues of water resources management and their budgeting systems are focused on water management. While there are also allocations for activities designed to manage the

impacts of climate change, it appears that generally there is no deliberate considered decision with respect to climate resilience.

The assessment exercise also revealed gaps and areas where institutional strengthening is needed at national and transboundary levels (e.g. LIMCOM), and highlighted the importance of having robust institutions at national level that can coordinate basin-wide strategies and activities. However, effective transboundary river basin management requires the participation of functional entities that can coordinate activities designed for the benefit of the entire basin. Currently, LIMCOM does not have the capacity to drive the coordination of these activities and thus has not fully utilized the opportunities presented by RESILIM and other partners.

Various strategies and technical studies have been undertaken for the sound management of the Limpopo River Basin, however there has been very little uptake of the recommendations and advice at collective basin level due to the weak institutional capacity of LIMCOM.

3.2.3 Opportunities for building institutional capacity

The observations and interventions identified under the Institutional Capacity Assessment Needs Report are articulated in a draft capacity strengthening plan which will indicate desired actions and outputs. The overall purpose of the strengthening plan is to set a solid foundation for increasing the capacity of key stakeholders to integrate climate change concerns into the policy frameworks, management and also mainstreaming climate change responses into regulatory frameworks and decision-making processes relevant for integrated water resource management.

The assessment coincides with the final stages of implementation of LIMCOM's 2011 - 2015 IWRM Plan. To that end, the Institutional Capacity Strengthening Plan would form a critical foundation for immediate, short, medium and long-term activities that may be relevant to further LIMCOM strategic planning.

Based on the analysis and with a need for quick impact initiatives that will demonstrate results to political constituencies, the following are recommended as next steps:

- Organize a workshop for validating the findings of this capacity needs assessment.
- Institute a forum for soliciting buy-in and political support on measures for strengthening LIMCOM and facilitating closer cooperation on the management and development of the Basin. This could be done at highest levels through a Ministers' Dialogue Forum.
- Conduct a technical meeting prior to the Ministers Dialogue Forum to identify priority issues and consolidate elements for the development of a common vision by all the four countries. The identified priority issues will be presented to the Ministers.
- Organize a stakeholder's meeting to sensitize and also develop elements for a common Basin vision on water and climate change impact responsive governance.
- Produce policy analysis briefs, concept notes and other knowledge products to stimulate continued discussions in identified areas of strengthening.
- Based on the institutional capacity needs identified in this assessment, develop and agree on a plan with the countries and other cooperating partners on activities to be undertaken including identification of resources.
- Embark on the immediate need to support the operationalization of LIMCOM

Specifically, opportunities to assist LIMCOM include assistance with the following:

- Knowledge management systems
- Scenario planning and budgeting for climate impacts
- Facilitation of agreements on information and data sharing
- Capacity building on water monitoring
- Database development
- Stakeholder engagement
- Mainstreaming resilience actions in program design
- Monitoring and evaluation
- Visioning processes and iterative planning
- Communication, sensitization and awareness on climate resilience, and,
- Developing and use of tools for mainstreaming social inclusion and gender equity



Talking about gender...

Women, youth, children and other vulnerable groups are the most likely to experience the impacts of climate change acutely including the challenges of floods and droughts. At the same time, they are the group most capable of creating change and adaptation within their communities. Women, in particular, play a pivotal role in the provision, management and safe guarding of water. These roles need to be reflected accordingly in any activities related to management of water and climate resilience.

~ Institutional Resilience Capacity Needs Assessment Draft Report,
June 215

3.3 Risk and Vulnerability training to strengthen integrated water, ecosystem management and climate change adaptation strategies

To further strengthen institutional transboundary and national structures, RESILIM and consortium partner OneWorld delivered training on the application of the Risk and Vulnerability Assessment as a tool for decision-making to 15 participants from the Limpopo DWS, the South African DEA, the GLTFCA, the MRCs, and the North West Department of Agriculture, Conservation and Environment.

The workshop participants took away the following messages:

The need for a basin-wide strategy is evident. In view of diverse stakeholder interests in the basin, it is acknowledged that for better management of surface water, groundwater, ecosystems and livelihoods, a systems management approach is needed.

Governance issues and the enabling environment are key focal points for building resilience in the basin. Adaptive capacity in the basin relies heavily on the strength of decision making institutions in the basin. While there are other adaptive capacity variables such as technology, without strong institutional support the benefits of these other layers will be of little or no impact. Governance rather than technical details remain a strong agenda for the workshop group going forward.

A basin-wide vision is required to get buy-in from the four riparian countries. A common vision for the basin is a precursor to any basin-wide strategy, and action to this end should take priority. If legislation is to change over how the river basins system is managed, it is unlikely that integrated management will be favored if such a common vision is not present.



Left: RESILIM Chief Scientist, Dr. Nkobi Moleele provides participants with the background of the Limpopo River Basin.

Right: The training included group work to practice using the R&V tool in various scenarios for decision-making.

Climate change is an additional stress factor in these communities. Climate change is having real impact on communities and plays a role in exacerbating the current challenges of declining ecosystem health and poverty.

Water scarcity is the key driver of vulnerability in the basin. With more severe water shortages predicted for the basin, addressing water scarcity should thus be prioritized through both the political and livelihood approach to the basin.

The evidence base of work done to date is acknowledged as insightful and sufficient. The research done over the past two years paint a clear picture of the challenges in the basin. What is needed going forward is an understanding of how this research will remain useful and relevant, especially within the context of refining and finalizing a basin-wide investment strategy for improved resilience in the basin.

3.4 Increasing the knowledge and awareness of climate change impacts and adaptation measures and integrated and sustainable water management

3.4.1 Blood River Community adopts a river

In Year Three RESILIM continued its support to the South African DWS' Adopt-a-River program to launch the Adopt-a-River campaign at Blood River and Seshego dam in the Limpopo Province of South Africa to raise awareness on integrated and sustainable water management strategies and best practices.

Adopt-a-River is an initiative by the DWS to promote aquatic ecosystem health, economic growth, human health, and co-dependent land and water use principles. The initiative also provides a work-based training program and encourages community participation in taking responsibility for the conservation of their environment. Over 100 volunteers took part in a cleaning exercise of the banks of the Blood River and the Sheshego dam, growing the volunteer workforce by more than 70% from previous levels.



Above: For kilometers the banks of the Blood River are strewn with solid waste – anything from nappies, construction materials, computer parts, plastic bags and tins, even a mattress.

Below: Hundreds of refuse bags of solid waste were collected by over 100 community volunteers from the banks of the Blood River and the Seshego Dam.





Left: At the launch of Adopt-a-River in Blood River, the RESILIM Outreach and Communication Specialist, Lara Rall, delivered a message of support, highlighted the importance of community participation for the success of the Adopt-a-River initiative, and how best water management and conservation practices by the community can contribute to improved livelihoods and enhanced resilience to the negative impacts of climate change. **Right:** RESILIM handed over educational posters and booklets to the Limpopo DWS and Polokwane Ward Councilors for use in their upcoming ward meetings.

3.4.2 World Water Week 2015

RESILIM partnered with the Botswana DWA and the South African DWS to host two awareness campaign events for World Water Week 2015.



>800 people reached

through an awareness campaign on the impacts of climate change and the importance of water conservation

Botswana: World Water Week in Botswana kicked off with a Water Pitso, an open discussion on water issues, with the theme of “*Sustainable Interventions to Address Botswana Water Challenges - In partnership with stakeholders*”. At the Pitso, the Minister of Minerals Energy and Water Resources, Mr. Kitso Onkokame Mokaila highlighted water-related challenges, such as the absence of suitable dam sites, the impact of climate change on water resources, and the spatial mismatch between water demands and availability. The Minister also articulated his appreciation for the partnership between RESILIM and DWA.



Above: 178 stakeholders attended to discuss existing water challenges in Botswana and explore possible interventions and collaborations to address water scarcity in the country.

Resolutions from the Water Pitso 2015:

- Water related laws to be enforced in the country;
- The draft water conservation strategy is to be completed;
- All ground water professional/experts should be engaged to find solutions to ground water challenges in the country;
- A countrywide ground water monitoring and reporting should be established;
- A policy to promote partnerships at national & community levels in the country will be formulated.



Left and Middle: RESILIM also co-organized and directed the main event, the World Water Day Celebrations in Francistown. RESILIM ran an exhibition stall to sensitize the community on the RESILIM program and DWA's cooperation in building a resilient, unpolluted Tati River. **Right:** RESILIM Chief Scientist, Dr. Nkobi Moleele in conversation with the Botswana Minister of Minerals Energy and Water Resources, Mr. Kitso Onkokame Mokaila.

South Africa: RESILIM and its partner, the MRCA and a number of trained volunteers worked together during World Water Week to reach over 600 community members from the Groot Marico area through a door-to-door awareness campaign. The campaign shared information on the impacts of climate change on rural communities and various climate change adaptation practices such as rainwater harvesting and grey water systems.

RESILIM and MRCA hosted a formal event in Groot Marico together with the North West, the Limpopo and National Department of Water and Sanitation, USAID Southern Africa, and members of the local community. Speakers included Martha Komape, Director of Water Regulation for the Limpopo Province and LIMCOM technical task team member; Cheryl Anderson, USAID Southern Africa Mission Director; Bishop M. Khunou, Special Advisor to the Premier of North West, and others.

Following the formal program, attendees witnessed a working group of the MRCA clearing invasive plants, attended an Eco-school session where young pupils were taught about grey water systems, and paid a visit to the Marico Eye and a Tufa Waterfall to appreciate the pristine waters of the Marico River.



Above: A door-to-door campaign by RESILIM and MRCA in celebration of World Water Week, highlighting climate-related issues and best practices for water conservation and climate change adaptation reached over 600 community members from the Groot Marico area.

The awareness raising in the community was a great success, people are starting to think differently.

~ Daan van der Merwe (MRCA)



Above: Attendees appreciate the clear, pristine water at the Marico Eye – the start of the Limpopo River.



Above: Solly Rampou, MRCA Youth Facilitator, demonstrates a grey water system to a group of youth from the Marico Primary School.



Above: Members of the RESILIM team together with members of MRCA. **Below:** The attendees of World Water Week celebrations in Groot Marico.



Below: Cheryl Anderson, USAID Southern Africa Mission Director being interviewed by the SABC News.





Above and right: An MRCA team demonstrates to the World Water Week attendees how they clear the area of invasive species.

The impact of invasive species in Groot Marico:

The natural environment of Groot Marico is infested with various alien invasive species such as the giant reed (*Arundo Donax*) and the bankrupt bush (*Seriphium plumosum*). Invasive plant species makes the natural environment, including the communities in the area more vulnerable to the impacts of climate change. Bush encroachment results in the suppression of herbaceous species leading to loss of biodiversity, reduced grazing capacity and degradation of the natural resources. These invasive species could also establish an invasive plant-fire regime as it both causes fires and recovers from them three to four times faster than native plants. It is also known to displace and reduce habitats for native species. Some invasive species have the ability to outcompete and completely suppress native vegetation, reduce habitat for wildlife, and inflict drastic ecological change.

3.3.4 Investing in youth for a resilient Limpopo River Basin

Pretoria-North, an identified RESILIM Resilience Action Area as per the Risk and Vulnerability Assessment is a low lying land and wetland that experiences variable rainfall, periodic flooding and droughts. It is densely populated area with poor infrastructure and limited capacity to adapt to the impacts of climate change. The area is also highly polluted with urban and industrial effluent originating in Tshwane, also known as Pretoria.



> 1 700 people reached through awareness campaigns to promote access and use of science based information for stakeholders

RESILIM partnered with the Kwalata Community Development Initiative and Science Unlimited to host the *Science for Resilience Expo* at the Kwalata Game Reserve in Hammanskraal, which falls within the Pretoria-North Resilience Action Area.

Pupils from the area, including the rest of Gauteng, North West and Mpumalanga were exposed to various workshops, theatre, illustrative talks and interactive exhibitions by experts from more than twenty universities, science bodies, conservation organizations, companies and government departments on climate change and natural sciences.

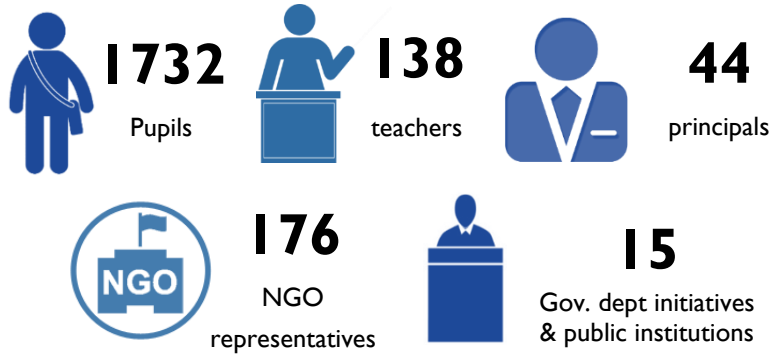
50

A record number of partners, compared to 19 partners in 2014.

"We believe the reason why we had so many partners is because of our partnership with USAID RESILIM."

~Charl Pretorius, Founder of the Kwalata Community Development Initiative

Attendees included:



Above left: RESILIM and Kwalata built a replica of the Limpopo River Basin that illustrated the interconnectivity between climate, water, biodiversity and livelihoods in the basin and how upstream water-use decisions make an impact on downstream water-users. This is now a permanent structure at Kwalata with school camps and other visitors coming to view the structure. **Above right:** Doreen Robinson from USAID and Kule Chitepo from RESILIM unveils a plaque at the basin structure during the Science for Resilience Expo.

[View](#)

[the television feature
of the Science for
Resilience Expo here](#)

Other strategic activities

4.1 Dissemination of the Risk and Vulnerability Assessment findings and recommendations

4.1.1 6th SADC River Basin Organizations Conference:

Upon a request for support from SADC, RESILIM supported the 6th SADC River Basin Organizations (RBO) Conference as the RESILIM program is designed to support LIMCOM, a sub-structure of SADC, to reach the objectives of the 2011 - 2015 Integrated Water Resources Management (IWRM) plan³³ and the program is recognized by SADC as an implanting partner of LIMCOM. At the conference, RESILIM had the opportunity to promote USAID Southern Africa and the RESILIM program, including the findings of the Risk and Vulnerability assessment to about 200 participants.

The 6th SADC RBO Conference is a part of a series of workshops successful held in various countries within the SADC region. The last workshop (the 5th) was held in June 2012 in Harare, Zimbabwe. The theme for the 5th workshop was "Monitoring the Implementation of the Protocol on Shared Watercourses".

SADC recognizes the need for all RBOs to share experiences with regards to their abilities to plan effectively and be better prepared for those calamities. This aligns with the purpose of disaster risk reduction and management which entails planning, preparation and effective responses. The ultimate aim is to enhance coordination amongst the various institutions towards the same goal which is aimed at optimizing the resilience of countries and river basins to natural disasters related to climate variability.



Above: RESILIM funded a *Sharing and Learning for Improved Resilience* exhibition area where organizations and RBOs could share research and information.



Workshop recommendations for effective Disaster Risk Reduction and Disaster Risk Management included:

- Continue to strengthen Island States DRR systems;
- Timely, accurate information and good data quality;
- Strengthened integration of the various players in DRR and DRM;
- Dam synchronization and management of politics and conflict in dam operations;

³³ The strategic objectives of the LIMCOM 2011 – 2015 Integrated Water Resource Management Plan are 1) improved disaster management; 2) improved water quality; and 3) improved water allocation.

- Strengthen RBOs and National Water Resources Management institutions for effective contribution in DRR;
- Put in place strategies to convince Member States and International Cooperating Partners (ICPs) to invest in DRR knowledge, data and communication systems;
- Develop and implement proactive strategies for DRR & DRM;
- Provide further guidance on the implementations of protocols that so far has facilitated cooperation, has acted as conflict prevention tool, and attracted financing in water sector;
- Need to match the Regional Strategic Action Plan (RSAP) Scope and Implementation Capacity
- RSAP IV needs to be developed in a consultative manner
- RSAP IV roles and responsibilities of different players should be clearly identified

4.1.2 Southern Africa stakeholders meet to discuss Integrated Water Resources Management

The two-day 7th SADC Multi Stakeholder Water Dialogue took place in September in Windhoek, Namibia where about 150 participants from across Southern Africa met to deliberate on the role that water will play in driving industrialization in the region. Industrialization which will contribute to development in the region; however, economic growth due to industrialisation means an increase in the demand of water resources. This will require to plan ahead and ensure water the quality and quantity of water in the region doesn't become a constraint, to the anticipated development. The workshop will also took the opportunity to validate the draft Regional Strategic Action Plan IV³⁴, which is currently being developed by SADC.

RESILIM facilitated one of the four breakaway sessions titled “It’s all about People,” that took a gender lens on water and industrialization to ensure that gender equity is included in the plan for industrialization in Southern African. Through RESILIM’s facilitation and the screening of the *Resilience Video Series #1: Marula Oil Production as a Climate Change Adaptation Strategy*, RESILIM added the context of community resilience and strengthening alternative livelihoods to the session.

All the presentations during the breakaway session touched on resilience building and alternative livelihoods to different extents and the outcome of the session was a recommendation for SADC to a) include women and youth in the industrialization process, b) create an annual youth summit to engage entrepreneurship and innovation by youth, c) strengthen women, youth and community level communication platforms, and d) strengthen an enabling environment for marginalized persons to participate in the SADC industrialization process.

4.1.3 Regional Conference on Vulnerability Assessment and Analysis and Climate Change:

RESILIM presented its Risk and Vulnerability Assessment at the *Regional Conference on Vulnerability Assessment and Analysis and Climate Change* in Cape Town in November 2015, to inform participants how climate-related events affect vulnerability, and what information is needed of climate change adaptation policy development and planning

³⁴ The RSAP IV is being developed after a consultation process in all 15 SADC member states. The RSAP IV aims to unlock the potential for water to play its role as a catalyst of socio-economic development and contribute to the SADC Goals of Regional Integration, Peace and Security, Industrialisation and Poverty Reduction with the ultimate aim of its eradication.

The purpose of the conference was to raise the awareness of Vulnerability Assessment Committee (VAC) stakeholders of the different sources of information and climate-related projects, and improve their capacity to undertake analysis that can be used in climate change planning in different sectors of government and stakeholders.

VACs?

The SADC Regional Vulnerability Assessment and Analysis (RVAA) Program has built up a vulnerability assessment system that consists of multi-agency multi-sectoral National Vulnerability Assessment Committees (VACs), working with the Regional VAC, chaired by the SADC Secretariat, to describe and forecast vulnerability to hunger and deprivation for the region's poorest and most marginalized people, and guide and inform policies and programming for government and all stakeholders concerned with the wellbeing of the countries' people.

The goal of the conference was:

- To increase the understanding amongst VACs of the nature of climate change adaptation planning and the types of information that it relies upon, so as to identify ways in which VAA outputs can contribute to this;
- To share lessons between VACs about the potential for VAC data and analysis to be applied in relation to the climate change policies of SADC Member States;
- To identify actions that would raise awareness and increase confidence in the use of VAC data and information for climate change adaptation interventions in SADC Member States.

The conference was organized around three main themes:

- Climate change in the SADC Region;
- VAA Analysis: Its role in sectoral and decentralize adaptation planning;
- Developing analysis for policy influence in relation to climate change

These themes were explored through a set of lectures and group discussions. A major objective of the conference was to bring out the information needs for climate change stakeholders using group discussions as well as reflection at the individual level.

See Annex Eleven for more detailed discussions and recommendations for improved climate change integration in policy development and planning.

“Climate change adaptation policy and planning are advancing in SADC Member States, often led by stakeholders who are not necessarily aware of the vulnerability analysis generated by VACs and its potential relevance for this exercise.”

~ Regional Conference on Vulnerability Assessment and Analysis and Climate Change Conference Report, 2014



Key concerns and comments from participants:

Participants were concerned about the current status of transboundary collaboration for water conservation in the Limpopo River Basin region. There is yet no legally binding agreement to preserve water resources and reduce polluting activities across the region and across border. Participants deemed the harmonization of laws and policies under a common framework to better manage water resources and to reduce households' vulnerability as a critical step towards improved transboundary management of share water resources.



Above: Participants at the Regional Conference on Vulnerability Assessment and Analysis and Climate Change, November 2014, Cape Town, South Africa.

4.2 RESILIM brings regional perspective to national resilience planning

RESILIM was invited and participated in the third of a six workshops series in Nyanga, Zimbabwe, which focused on *Delivering Solutions*, to address objectives of *mainstreaming climate resilient planning* and *developing financing and investment strategies*.

The GWP-SA Water Climate and Development Program (WACDEP) is implementing the Water Security and Climate Resilient Development program.

RESILIM added value to the workshop by bringing a regional perspective to national climate resilience planning to ensure that participants consider the transboundary implications of their decisions around water use, and to advocate for a climate-water-livelihoods-ecosystems nexus-thinking approach to ensure a broader perspective when planning for future water use.

4.3 Collaboration between RESILIM-B and RESILIM-O

The RESILIM met with the RESILIM-Olifants program this quarter to explore possible linkages and opportunities for collaboration, especially in the geographical areas where both programs work, such as in the Great Limpopo Transfrontier Conservation Area and Mozambique, and where the two programs have the same partners and stakeholders. Immediate areas identified for possible collaboration are in communications and stakeholder engagements. RESILIM-Olifants will be included as a stakeholder in RESILIM's Disaster Risk Reduction In-country Consultations, and RESILIM will provide RESILIM-Olifants with guidance on grant management and program management.

A follow-up meeting between the communications staff of the two programs, identified a Resilience Learning Network and an annual awareness campaign as two activities for the programs to collaborate on. These events are planned to take place in November 2015. RESILIM was also able to support RESILIM-Olifants with guidance on and communications such as progress reporting and other communication products.



The Resilience in the Limpopo (RESILIM) Olifants program is a five-year program implemented by the Association for Water and Rural Development (AWARD) and funded by USAID to support a more resilient Olifants Catchment in South Africa and Mozambique.

Having the same results framework of the basin-wide RESILIM program, the RESILIM-Olifants program aims to improve water security and resource management at a catchment level, the Olifants catchment.

Above: The two RESILIM programs met twice in the quarter to plan for collaboration. **From left to right:** Derick du Toit (RESILIM-O), Lara Rall (RESILIM), Lynette Strauss (RESILIM-O), Dianne Tipping-Woods (RESILIM-O), Thami Sonile (RESILIM-O).

4.4 RESILIM sharing development impact

RESILIM had many opportunities over Year Three to interact with various United States Government (USG) representatives interested in the project and our beneficiaries in the region, and the team was delighted to share lessons learned and development impact with these visitors. The USAID Assistant Administrator for Africa, Mr. Tom Delaney, paid a quick visit to the RESILIM office in Pretoria for a briefing on the program. RESILIM together with its partners, the Global Water Partnership Southern Africa (GWP-SA) and Peace Parks Foundation shared challenges and successes in addressing resilience in the context of climate adaptation and biodiversity conservation in the region.



From left to right: John Notoane (RESILIM), Ruth Beukman (GWP-SA), Tom Delaney (USAID), Kule Chitepo (RESILIM), Fezile July (RESILIM), Roopa Karia (USAID Southern Africa), David Gadd (RESILIM), Lisa van Dongen (PPF), Zoltan Milic (Chemonics).

RESILIM also accompanied USAID Southern Africa Deputy Mission Director, Alonzo Wind on a three-day field excursion to the Pafuri Resilience Action Area. This included a visit to the Makuleke Village where the party met with the Makuleke Communal Property Association to better understand the history of the Makulekes, the challenges faced in the region, and to share experiences of RESILIM-related activities in the area, such as the Participatory Governance Training that took place in partnership with the Southern Africa Wildlife College (SAWC) in 2014.



Above: USAID Deputy Mission Director, Alonzo Wind (left) hands over a plaque to Mavis Nhlatlane, Chairperson of the CPA to reconfirm USAID and RESILIM's commitment to building the resilience of the Makuleke Community and in the broader Pafuri-node.

RESILIM and USAID visited various tourism-based operations and sat in the Great Limpopo Transfrontier Conservation Area (GLTFCA) Joint Management Board meeting which provided USAID insight on the work RESILIM and the PPF partnership is doing regarding an integrated planning framework for TFCA/Pafuri-node that will set out future conservation land-use and transboundary tourism routes.

The trip ended with a visit to the closed-down Tshikondeni Mine which is in the process of being rehabilitated. RESILIM, PPF and SAWC are continuing discussion regarding the possible conversion of the mine's staff accommodation into a Resilience Training Centre.

Furthermore, in year three RESILIM also accompanied representatives of USAID Southern Africa and the provincial officials responsible for the biodiversity stewardship program in the North West Province of South Africa to visit part of the proposed Marico Biosphere Reserve; the Marico Eye, the Tufa waterfall and the proposed Rietspruit Nature Reserve, which is a flagship biodiversity stewardship project for the North West Province.

"The trip was exceptionally worthwhile and a great learning opportunity to understand the biological wealth of the Groot Marico catchment and engage with the project beneficiaries and champions on the long term socio-economic returns of investing USAID resources in the catchment.

It was truly amazing to observe the level of commitment and partnerships between the local communities, government department, land owners, conservation authority and the RESILIM team and the recognition about the potential contribution of the green economy towards addressing the socio-economic challenges of Groot Marico".

~ Mahlodi Tau, USAID Southern Africa



Left: The group inspects the clean clear water from the streams that form the Marico River. **Right:** Mr. Moremi Lesejane from the North West Parks Board drinks water from the stream.

4.5 Exploring the Waterberg Biosphere Reserve

The RESILIM Program’s Biodiversity Activities Manager and the Outreach and Communication Specialist, accompanied by Lucas Namanyane from the Waterberg Biosphere Reserve, attended the Waterberg District “Wetlands for Prosperity” Workshop, as well as the Third Waterberg Environment and Biodiversity Conservation Forum meeting to better understand the challenges and the opportunities for building the resilience and for protecting the Waterberg area. RESILIM took the opportunity to speak to various stakeholders such as community representatives, civil society groups, government officials and park managers to hear firsthand about the issues in the area, and also to share the recommendations from the RESILIM Risk and Vulnerability Assessment regarding the protection of high altitude catchment areas.



Above: Rain falls in the Waterberg. The Waterberg has been identified in RESILIM’s Risk and Vulnerability Assessment of the Limpopo River Basin as a high altitude catchment area that produces more water than lower lying areas. The protection of these high altitude catchment areas as critical for water security and climate resilience in the basin.